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THE LURE OF SPEED

London.

H. O. D. SEGRAVE

Frontispiece

The
LURE of SPEED

by

Sir Henry Segrave

with a preface
by the
Rt. Hon. Sir Arthur Stanley, G.B.E.

Illustrated

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This book is dedicated
to
Sir Charles Wakefield, Bart.,

in grateful appreciation of his never-failing help and kindly advice to me during the past eight years. A man whose enthusiasm in all fields of mechanical progress has led him to give his utmost assistance to those who, each in their own small way, have endeavoured to prove that the pioneering spirit is still alive in England to-day.

H. O. D. Segrave.

1928.

PREFACE

MAJOR SEGRAVE has written a book which in my opinion will stand for long as a classic in the literature of Motoring. It is full of sound reasoning and careful thought, of the lessons learned during a life more strenuous than that of any other motorist, living or dead, of reflections upon the present and forecasts for the future which have a definite value to all interested in automobilism.

Not only has he packed this record of an unique career with sound technical sense, but he has told the story of his own life as the world's champion racing motorist with a modesty of restraint which nowadays is rare. It is the book of a man of action to whom the ultimate end of his work has always obscured the purely personal.

The chapters on speed, on the future of motoring, and on accidents are full of reasoned thought and common sense, while the humorous incidents of a life spent on practically all the great motor-racing tracks and road circuits of Europe—to say nothing of America—are told with the generous wit and understanding of a great-hearted man of the world.

ARTHUR STANLEY.

AUTHOR'S PREFACE

I HAVE tried in this book to set down for the use, and possibly the interest, of others, the lessons which I have learned during a fairly strenuous professional life of eight years on most of the principal motor-racing tracks and road circuits of Europe. It has been my object to place on record, first, the technical lessons I have learned—lessons which every day influence the future of motoring more seriously; secondly, the story of such adventures as have befallen others and myself during the great races; and, thirdly, such humorous incidents as have lightened from time to time the thrills and ardours of a profession which, whatever its demerits, can at least lay claim to the necessity for a perennial sense of humour and tolerance.

It has been my earnest aim to set down nothing which may offend or hurt others, and nothing which may be otherwise than useful or amusing to those who share with me an abiding interest and faith in the past, present and future development of motoring.

Some of the incidents I have related took place seven and eight years ago, but although one's memory naturally becomes a little fogged with time, I have tried to tell such stories as accurately as possible and as one remembered them at the moment. I hope, therefore, that any little discrepancies will be considered as unavoidable and unintentional under the circumstances, and that they will be regarded as charitably as possible.

I would like, finally, to place on record my thanks not only to the many colleagues who made my racing life the pleasant memory it now is, but also to those splendid sportsmen in America whose hospitality, help, and open-heartedness will remain always one of the landmarks in my life.

H. O. D. SEGRAVE.

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THE LURE OF SPEED

CHAPTER I

SPEED *QUA* SPEED

The evolution of speed—What increased rapidity of transport means to civilisation—The advance of speed with safety in automobile construction.

ON speed, in itself, as a factor in human evolution I cannot for a moment consider myself qualified to speak with any authority. This is a matter that I am only too ready to leave to the scientists. But it was hardly possible, in the few years which I devoted to the attainment of speed in motor-cars running upon the track and the road, that I could escape the conclusion that speed had an altogether wider application than that with which I had been particularly concerned.

Many a time I have asked myself—and always without being able to return a comprehensive answer—why such an immense amount of human effort is expended on speed. Is it not that it is one of the dominant factors of our modern civilised world? Throughout the ages, throughout the whole scale of animate life, speed has always been a dominant factor.

The attainment of speed is an instinct inherent in the normal human being and in the vast majority of animals, and one which has played a most important part in the process of evolution.

It is a thousand pities that the keeping of records has only been possible for so short a period. Otherwise we might have been able to compare the ordinary cruising speed of a Golden Eagle with the performance of its prototype of ten thousand years ago. I am convinced that the comparison would have shown that, by a process of evolution, Nature had contrived to enhance its aerodynamical efficiency to a considerable extent.

The rapid evolution of mechanical speed is one of the greatest wonders of the modern world.

Within recent years we have seen 1500 c.c. supercharged motor-cars attaining speeds far beyond anything within the reach of vehicles that, twenty years ago, boasted engines of ten times their capacity.

In the animal world the development of speed has, of course, been infinitely slower, but the same end has been reached.

I suspect that it was the turning-point in human affairs when man began to take a close interest in the speed of other animals and realised in his immature mind how he might best turn this to his own advantage.

The employment of a horse as a beast of human burden was as big a thing for primitive mankind as the invention of the steam-engine and the railway to his descendants. Until that time man's maximum ground speed on the level was of the order of twenty miles an hour, which corresponds to covering the hundred yards in the level time of ten seconds. I do not think our distant forbears, athletic as they had to be in order to obtain their food-supplies, were actually any faster than the present-day runner in, say, the Olympic Games. The probability, however, is that they could run a longer course before collapsing.

Now, by exploiting the horse, the maximum land speed available was increased from roughly 20 miles an hour to something over 30. I believe that the Derby is run at a mean speed of over 33 m.p.h. Probably the prehistoric horse was a good deal slower, for the modern race-horse is the product of generations of careful breeding and training.

It is doubtful, however, whether the human runner has enhanced his performance in proportion. But that is because the need for him to be fast on his feet has disappeared with the coming of civilisation. Civilisation seems to imply the getting of other people or other animals to do the work which formerly we had to do ourselves. Prehistoric man's ability to run was his very livelihood. As soon as he had found a better means of accomplishing the same end, he kept his running as something to do for the fun of it, or perhaps, if he were not feeling very brave, as a reliable defence against an enemy.

It will be seen that, in this connection, history is in a fair way to repeat itself. Since the introduction of the motor-car—and from a practical point of view that is only seven-and-twenty years ago—the horse has steadily declined in its value as a means of transport. Providentially for its existence it has assumed a growing importance as an instrument of sport.

Precisely when the horse was first subjugated to the service of humanity I have no means of knowing, but he ruled the kingdom of speed for centuries until Mr. James Watt, Mr. Trevithick, Mr. Stephenson, and other imaginative scientists brought his long dynasty to an end.

The steam-engine produced the railway locomotive, and the latter directly produced the mechanically-propelled road vehicle. This last, however, was side-tracked until the pneumatic tyre came to its rescue. The velocipede gave birth to the bicycle, the bicycle brought the pneumatic tyre into being, and the pneumatic tyre alone made the modern motor-car a practical and possible thing. Out of the motor-car arose the aeroplane—and so this amazing curve of speed goes on.

Throughout all this period of rapid evolution one of the most potent agencies has been speed competition. The moment one railway engineer had accomplished his 40 miles per hour a rival was ready to claim 50 and to make good his boast. And so it has been throughout the whole scale. In particular the early cylist deserves the gratitude of those of us who live in an era of high speed and find it pleasant to do so. Had it not been for his strenuous demands for something faster than the iron tyre, and then for something better than the solid rubber tread, we might have had to wait a long time for Mr. Dunlop's revolutionary invention. It has in all probability made a bigger difference to the lives of the inhabitants of the earth than any other invention, with the possible exceptions of the compass, the steam-engine and the electric telegraph.

Perhaps one of the most amazing things in the world is the manner in which the habits of man adapt themselves to the results of his discoveries and inventions. When the first railway tracks were laid and the engineers talked boldly of a speed of 60 miles an hour, there were plenty of learned professors who were ready to prove that such a rate of travel was more than human faculties could endure. Within a comparatively few years these gentlemen were doing their mile a minute in a railway carriage and regarding it as the merest commonplace.

Much the same cry was raised when the automobile designers talked of cars doing 60 miles an hour on the road. Numerous doctors held it to be impossible that any man should be able to control and steer a vehicle at such a monstrous speed. But who worries about sixty miles an hour to-day ?

When the 1000 horse-power Sunbeam car was built, and it was confidently announced that it was intended to attain 200 miles per hour, there were hundreds of skilled engineers, whose names are household words, who asserted that it could not be done—not because the thing was mechanically out of the question, but because control of the vehicle at such a pace was beyond the limit of human capability. I received not a few warnings of the danger I ran in making the attempt to drive a car at 200 m.p.h. I am sure they were sincere and that they were sent to me in a spirit of kindly sincerity. But that does not alter the fact that they were nonsensical.

I am not going to pretend that driving the big Sunbeam, even under the almost ideal conditions offered at Daytona Beach, was the easiest thing I have ever had to do, but I can say without hesitation and, equally, without conceit, that there was never any question at all of the machine beating the man. Obviously, if someone who had not had a great deal of practice in driving really fast cars were to open the throttle, he would, in all likelihood, soon find himself in serious trouble, but that would be because he was not used to such unusual speeds. One does not teach a would-be aviator to fly in an aeroplane that has a landing speed of a 100 miles an hour, but such a machine offers no serious terrors to a man who has, by practice, gradually built up his speed experience, thus making normal to himself what would be highly abnormal to others.

When I say above that the machine never looked like beating the man, I am simply placing on record the result of my own personal observation. *The reaction between eye, mind, and muscle is so instantaneous that I believe one could learn to drive habitually at 200 miles an hour (supposing road conditions admitted of it).* What is true for 100 m.p.h. must ultimately be true of 200 m.p.h.

When the 200 miles race at Brooklands, promoted by the Junior Car Club, was a straightaway event instead of being, as now, diversified by obstacles, three cars, of which I was driving one, completed the distance non-stop at an average of 100 m.p.h. I am sure that Mr. K. Lee Guinness and Mr. George Duller will agree with me that before the race was half-way through this speed had become almost boringly slow, and we should have welcomed any chance that presented itself of departing from our prearranged schedule.

All this brings me to the conviction that no man will ever devise a machine so fast as to be beyond the control of a human being. Naturally, one must define certain limitations. For example, no one could take the 1000 h.p. Sunbeam at anything like its full speed round a moderate bend. But that is merely because this car *happens* to have an engine at each end of its chassis ; it has nothing to do with its speed potentialities on the straight.

If it were necessary to do so, I am well satisfied that it would be possible to produce a 200-mile per hour car capable of maintaining its stability at very high speeds round bends. That necessity has, however, not arisen, and it is highly doubtful whether it ever will arise, because as more arterial highways are built, and as the speed of road transport increases, so must the roads become straighter.

To a large extent all racing is utilitarian and it must, therefore, always be subject to the fact that the curve of what is *physically possible* will intersect the curve of what is *practically worth while.* Whilst I would set no arbitrary limits to the former quantity, I cannot shut my eyes to the fact that the latter has definite boundaries beyond which it will be difficult to pass.

The racing motor-car, the racing motor-boat, the racing aeroplane, capable of doing in speed what has never been done before, can always be designed, but when it comes to its being built, someone is bound to ask the question: "What's the use of it, anyhow?" And on how this is answered will depend the materialisation of the conception.

As to this aspect of the matter, I must admit that not the least weighty factor which has led to my retiring finally and irrevocably from motor-car racing is that I cannot see much further use for it. Every year the possible gains become, smaller and smaller and the possible losses and risks greater and greater. Of course, there will be motor racing for years and lessons of a high practical value will be deduced from it, but it just happens that this is not the kind of racing in which I am likely to be interested.

As I mention elsewhere in this book, I see clearly enough what an immense benefit racing has been to the development of the standard touring car. But I never pretended that I drove racing machines in the interest of this particular development. The utilitarian aspect was visible all the time, but it was, first and last, the sporting side of racing that appealed to me. That, I think, will unfortunately fall into the background since, under modern economic pressure and the intensity of the struggle for industrial existence, fewer and fewer out-and-out racing cars will be built, while racing regulations will be modified to give encouragement to the almost-standard sort of car.

No one, I imagine, who has been privileged to ride the best blood-horses in the world will willingly return to the humdrum hack.

I have, since my return from Florida, frequently been asked to say what I thought was the highest safe speed for a motor-car upon the public highway. A question not of the legal limit but rather of the practical limit. There is, of course, no answer whatever to a conundrum of this sort, for it has all the marks of what a mathematician calls an "indeterminate equation." Many a time I have done 100 miles an hour on the road—I am not going to specify exactly where—and I hope to do it again very often in the future, for there are conditions, depending upon the road and upon the car, under which such a speed is quite safe. Its possibility is undoubted and undeniable: its likelihood and expediency unquestioned.

It is true that in these circumstances the very qualities in the touring car which are engendered by racing practice stand at a premium; I refer to such attributes as lively acceleration and rapid and certain braking. But already—and we are only at the beginning of things as yet—everyone who uses the roads must have remarked that the opportunities for safely exploiting high speed are becoming less and less, and that they will continue to do so goes almost without saying, until those in authority realise that to keep up with progress and to cope with the increasing speed of road transport they must re-design their highways.

In considering the possible and probable future development of the motor-car we have to realise how essentially dependent it is upon other agencies in general and other forms of transport in particular. What of flying ? It is obvious that the time is not far distant when the air will be not only quicker than the road for even comparatively short distances, but a great deal cheaper, simply because it can never be subject to serious overcrowding and, to delays in consequence of overcrowding.

But the aeroplane is by no means the only rival of the motor-car. Day by day scientists are busy upon improvements in the facilities which render it unnecessary to move our bodies about when we want to get action at a distance. The telegraph, the telephone, radio-telegraphy, radio-telephony—all enormously increase our scope of action while saving time. If my place of business is in London and I wish to transact a deal in Leeds, it is far less necessary for me to go to Leeds in person to-day than it was twenty years ago. It will be still less necessary in the near future, when I shall be able to see, as well as to hear, by either wire or wireless. Who can doubt that some day, soon, we shall be able to affix our legal signatures to a document that lies in an office three hundred miles away ?

All these things have a big bearing upon automobiles and scarcely less upon the whole question of speed. In the past speed has always meant the rate at which a body could be moved from one place to another. In the future the speed which will matter will not be physical speed at all, but merely the translation of action, and as the services devised for this purpose are extended, simplified, and cheapened, the need for physical movement will proportionately decline.

There is always the question of goods to be considered, and it would be ridiculous to regard transport as having importance only on the personal side. The transport of certain perishable and urgent cargoes will continue to increase as it has been increasing in the past. It will do so until it reaches its economic limit. As to the transport of other material—which may be assumed to be about 95 per cent of the total—I am of the opinion that it has probably passed its economic limit of speed already, and that, if the community were better ordered and organised, merchandise would travel more slowly and more economically.

CHAPTER II

RACING—PAST, PRESENT, AND FUTURE

" The Race of Death "—How the type of car has gradually changed, and why—Dreadnoughts of the old days—A Grand Prix comedy.

NO one is really entitled to talk about the Future of motor racing, for all that can be said is the merest conjecture, and as to the Past I suppose that there are very few drivers who have won leading events who could not speak with greater authority than myself.

I did not really take up racing seriously until 1918, by which time motor racing, either regarded as purely a sport or as a means of technical research, was in its twenty-fourth year. It had started seriously in 1895, when Levassor, on a Panhard with an engine rated at 4 horse-power, had succeeded in travelling from Paris to Bordeaux and back again—a distance of 732 miles—at an average speed of 14·91 m.p.h.

In spite of the lamentably frequent casualties that are constantly occurring in motor racing many of these intrepid pioneer drivers are still happily alive. I have had the pleasure of meeting some of them and I regard it as a great privilege to have done so. Compared with what they did in those early days, the exploits of the post-war racing car drivers seem puny indeed.

I do not write this sentence with the idea of obtaining credit for becoming modesty. It is simply an incontrovertible fact. Certainly there were giants in those days. Latterly, in spite of the arbitrary regulations which the racing authorities have imposed upon us, we have succeeded in setting up higher average speed figures. But it is not to be forgotten that the restrictions on engine dimensions, and the artificial corners which have become so closely associated with modern racing-car practice, are nothing compared with the difficulties with which early drivers had to contend when the design of racing vehicles was in a distinctly embryonic stage, and road conditions were infinitely worse than anything we know to-day.

This factor alone makes some of the performances put up twenty or so years ago almost incredible. Take the question of dust, for example. Since I have sat at the wheel of a racing car dust has scarcely ever been a serious nuisance. As a rule, in every road event in which I have participated, the surface of the circuit has been specially treated, either with tar or calcium chloride. At the worst it has only been a matter of a little dust raised at corners, where the skidding of braked and fully locked wheels had torn up the surface.

Moreover, in a circuit race—irrespective of its length—one always knows exactly almost what to expect, for not only does one's knowledge of the course improve with every lap, but, generally speaking, one has had ample opportunities of learning something about it at practice. Hence, even if there is local dust at odd points, it has but little effect on one's speed, for one knows pretty well that it will only last a few yards at the most, and one also has a shrewd idea what is the other side of it.

What racing drivers of the old school—and these were great men if ever great men existed—had to put up with in the way of dust clouds almost passes belief. When I look at some of the figures I can hardly imagine how they were done.

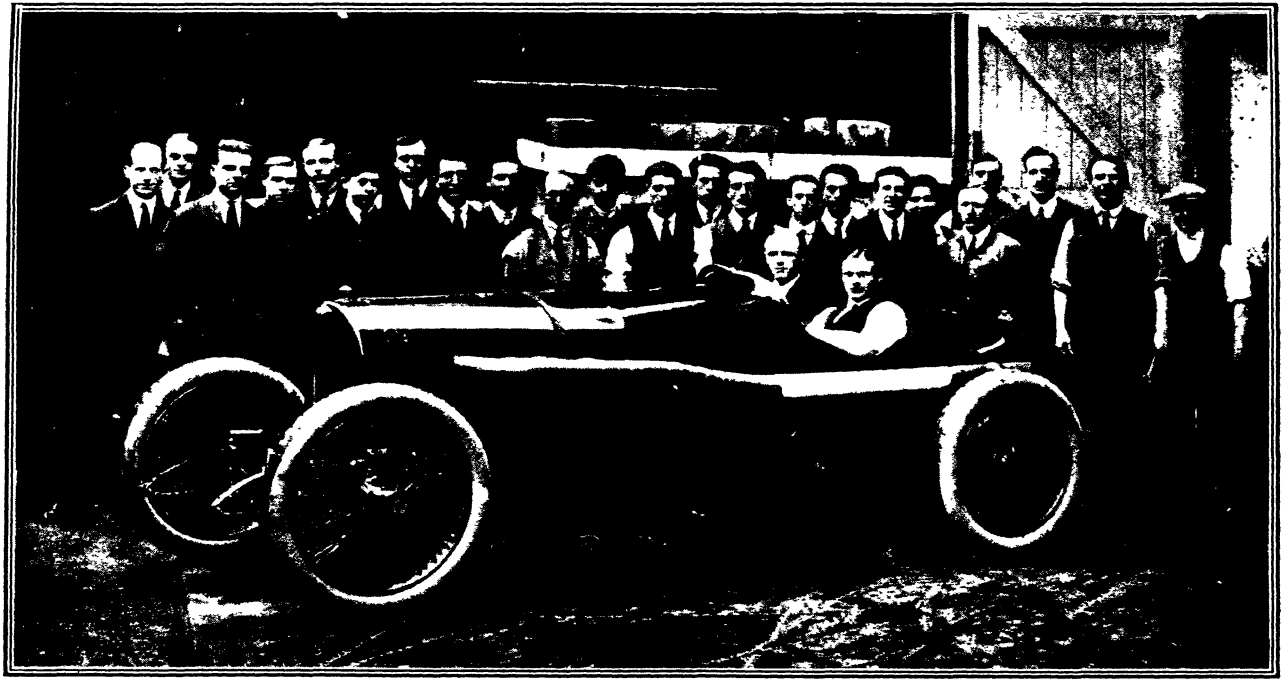
Take, for example, Gabriel's feat in the ill-fated Paris-Madrid race of 1903. There were so many fatalities in that event that it was brought to an end at Bordeaux by the French Government. On his 70 h.p. Mors car Gabriel averaged over 65 miles an hour for the distance of 342 miles. He started 168th and had accordingly been forced to pass 167 cars, many of which, alas, he saw reduced to wrack and ruin by the roadside. For the greater part of the distance he travelled in a white cloud of dust, so opaque that several drivers in this race met with serious if not fatal accidents, since they had nothing to guide them but the scarcely visible tops of the trees that lines the long roads and sometimes deceptively went off into no road at all.

Here was no circuit race, but a straightaway run (or it was intended to be) between the capital of one country and that of its neighbour. Adequate practice over the route was out of the question, and, even if it had been feasible, no ordinary human being could have memorised all its incidents and difficulties. And yet Gabriel averaged 65 miles per hour, 11 miles an hour faster than Charles Jarrott's 70 h.p. Panhard in the Circuit des Ardennes of the previous year. And it was no runaway race, for Galleron, on a second Mors, arrived about half an hour after Gabriel, whilst the redoubtable Charles Jarrott in a De Dietrich was only about five minutes after him.

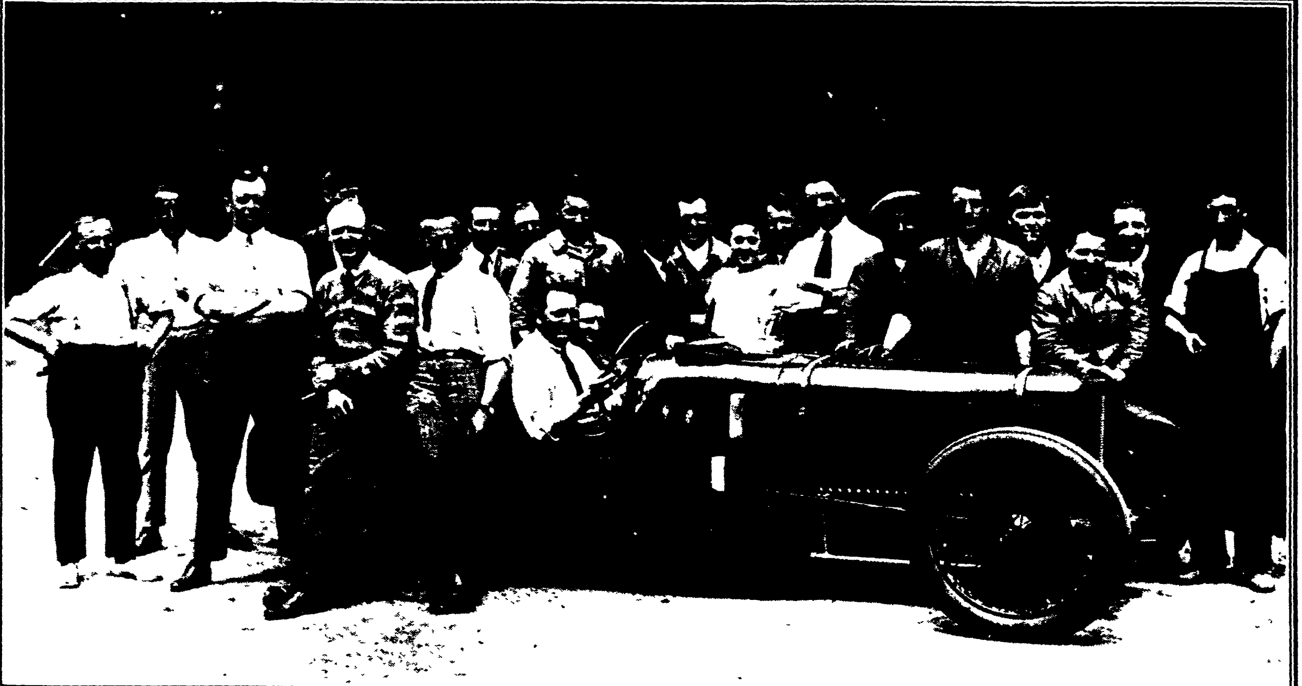
From these figures one deduces that Gabriel would have the road fairly clear for himself during the last three hours. That is about all. He had to drive through a crowd which, unrestricted by any proper marshalling, did its best to provide at least one suicide per kilometre.

In my opinion this achievement of Gabriel's will rank as one of the greatest that has ever been done on road or track with a racing car. And it becomes all the more wonderful when we pause for a moment to contrast the sort of machine he had to drive with the racing car of to-day.

Of course, for its time, it was the last word in advancement, and except for the fact that it had



THE FIRST RACING CAR DRIVEN BY THE AUTHOR IN ENGLAND
The 4½ litre Grand Prix Opel, previously driven by Joerns in the 1914 Grand Prix



THE SUNBEAM RACING TEAM (1924)

Harrison (foreman mechanic), Grattan (tyres), K. Lee Guinness, H. O. D. Segrave, Murray, Dario Resta, Perkins, Atfield, J. Scales (spare driver)
J. Moriceau, Ledu, V. Bertarione (designer), Marocchi, Ridley, Capt. Irving (chief engineer), Harold, Barrett, Hicks

to comply with a certain maximum total weight, its designer had been given a free hand. Its acceleration, compared with a modern racer of only 1500 c.c., or a nominal 10 h.p., must have been unspeakably sluggish, its vibration terrible, its control a task for a superman, its brakes—on rear wheels only—a very delicate piece of apparatus, its tyres . . . Heaven forbid that one should speak of the tyres of those days! And there were no detachable wheels or rims to help the unhappy driver and his mechanic when the inevitable puncture or burst occurred, which, according to history, they did with unfailing regularity.

And yet, in spite of all these difficulties, Gabriel averaged 65 miles per hour for 342 miles! I wish I could have seen this magnificent effort. Upon the basis of my own humble experience it was then, and still is, one of the greatest speed feats in the whole history of automobilism. It will never be beaten and it will never be equalled. In this, of course, I am not so much referring to speed as to human pluck and endeavour.

As a matter of fact, in September of the very next year, 1904, Lancia in a 90 h.p. F.I.A.T. averaged 72 m.p.h. for the 231 miles of the Florio Cup race. I mention this, as one of many splendid performances of about the same time, for this reason, that the modern generation of motorists, to which I myself belong, has a very poor opinion of what was done in the old times. It does not realise the high speeds that were attained, the delinquencies of the machines that produced them, or the manifold dangers and difficulties of the road conditions.

One reason for this state of affairs is that it reads—whenever it has the inclination to turn over the old files of the *Autocar*—of 90 h.p., 100 h.p., and 120 h.p. racing cars. Monsters they undoubtedly were, but speed is a maker of brakes, horse-power, and weight. The 1500 c.c. supercharged engine of the Darracq, with which I won the 200 miles Junior Car Club's race at Brooklands in 1926, gave an output in the neighbourhood of 160 h.p. The car itself weighed 15 cwt. This was a great deal lighter than the monstrous old Panhards, Renaults, De Dietrichs, Mors, and Mercédès that in the old days thundered over the dusty roads of Western Europe.

I have often wondered what would have happened if the Paris-Madrid race had ended differently. Its toll of lives was so heavy that it was referred to in the newspapers as " The Race of Death," and in a sense it was the Death of Racing. By this I mean it was the last of the great point-to-point races. Thenceforward all road races were confined to a circuit, upon which encroachment on the part of spectators could be prevented.

For several years nothing was done by the racing authorities in any country to restrict the power of cars. Designers were given a free hand, except in the matter of total weight, and although *average* speeds did not increase—on the contrary, the selection of difficult circuits brought these down if only by the multiplication of tyre troubles and the failure of gears, braking, and so forth—*maximum* speeds were enhanced and the element of danger became extremely prominent.

I do not think that the authorities were then concerned with the wide gap that separated the racing car from its contemporary touring vehicle. They knew perfectly well that they were encouraging technical progress even if they were doing so in rather a blind manner, and they can have had no doubts whatever about the sensational appeal that their events were making to the public. But —reading between the lines of a portion of automobile history that still remains to be properly written—they evidently at last realised that unlimited racing was something which the motor manufacturers could not go on supporting indefinitely, and also something in which the public interest was declining.

The anti-motorists, who flourished in those times, did not fail to grip the handle of the argument which the numerous fatalities afforded. Slowly but surely it began to be recognised that all-out motor racing had gone far enough, and those who had its best interests at heart set about devising means whereby racing as a sport and spectacle should still be as great as ever, but at the same time the risks to the participants should be diminished, whilst the technical lessons learnt by those who cared to race should have a more direct application to the improvement of the breed of the ordinary touring car.

But to turn to modern racing and compare its effect on the physical and nervous system.

Racing to-day is altogether a different problem. Whereas in the old days the strain was 90 per cent a physical one, to-day it is 90 per cent a nervous one. In those early days the cars were so badly sprung, had such bad steering and were so heavy to drive that a man of powerful physique and in sound condition was necessary to drive them. To-day, as the riding qualities of the cars have improved, with the passage of years and through the invaluable experience accumulated, so they have become easier to control, and lighter to steer, thus reducing the physical effort necessary to maintain them at high speeds on the road.

Although the cars necessitate less physical effort they are a great deal more dangerous, in my opinion, than their earlier prototype, because owing to their extreme lightness and to the very high speeds which they are capable of attaining, it has become necessary for the driver's entire faculties to be kept constantly alert. A second's inattention and the car is out of control, a momentary glance to the right or to the left and the result is the same.

Instead of brute strength being necessary, light-handedness has become of paramount importance, and I think that, were you to put a racing driver of eighteen years ago on a car of to-day he would cut a lamentable figure. The drivers which the evolution of the racing car has produced are nearly all scientists at their own particular game. The knowledge of mechanics and engineering required successfully to coax a modern racing car through a Grand Prix is far in advance of the early days. To-day the racing car is built so near the limit that ignorance on the part of the driver as to what r.p.m. the engine is capable of standing may have disastrous results. A modern engine has a safety limit of r.p.m. which must not be exceeded, and it is all the more difficult to keep within the safety limit when one realises that the engine will in a second or less accelerate to double the speed at which it was designed to turn.

An instance of a driver of the Old School being put at the wheel of a modern racing car occurs to my mind at the moment. The driver was a man whose name was a byword in the early days of racing. He had not driven for some considerable number of years. It was at the French Grand Prix at Strasbourg in 1922. He treated his car as if he were driving one of the old Darracqs of 1907 or 1908, which you could not, figuratively speaking, have broken with a sledge-hammer.

I was standing beside him when he started for practice on the Grand Prix circuit one morning. An immensely powerfully-built man, he seized the change-speed lever and endeavoured to engage first speed with a wrench—the lever came completely away in his hand ! This was repaired and I think he was able to struggle as far as the first hair-pin bend. Three-quarters of an hour later we saw him walking mournfully back to the pits. We asked him what had become of the car.

" Eh bien ! " he exploded. " Ze car, she is dead—dead in a field ! *Cette sacre voiture !* I like not these cars made like watches ! Give me ze old cars whose chassis did not bend like rubber when you drive them ! "

Apparently at his first corner he had tried to skid the car round as was frequently done in the old days. The result was that the steering wheel came completely off in his hands and the car charged through the hedge and landed in a potato field.

Some of the Sunbeam mechanics who were at the corner when this happened told me that he was so furious that he stood at the side of the road in a trance, looking at the steering wheel still in his hands. All of a sudden, his Latin temperament got the better of him and with a terrific oath he hurled the offending steering wheel as far as he could into the potato field after the car. After he had calmed down, he spent the best part of an hour looking for it again !

This little illustration serves to indicate my point that a successful racing driver of to-day is a much more highly developed organism than his prototype of twenty years ago.

CHAPTER III

WHY FIRMS RACE

Why firms race—The object of motor racing and its technical value. The advancement of internal combustion engine design—Touring car improvements—Road racing to-day—“ Where are the English drivers ? ”

MOTOR racing is generally regarded either as a sport, in which case it appeals to the adventurous, or as a form of advertisement, in which case it is certainly a weapon with two edges.

Anyone who is familiar with the means whereby racing cars are produced must know that they are extremely expensive toys. If it were solely a question of advertisement, the same object could be obtained, probably more cheaply, and certainly more effectively, by the ordinary direct methods of publicity. The real reason for motor-car racing is that it enables one to find out more about the technique of motor-car design, to apply and test new ideas, and to devise means whereby previous standards of efficiency can be improved.

Any designer who conceives a new idea in engine design, which he regards as suitable for touring cars, will be wise if he takes immediate steps to test it on a racing car. Since the stresses of racing work are infinitely higher than those reached in touring, it follows that if his idea can successfully pass the test imposed upon it by racing conditions, it will at least stand a chance of being applied to ordinary car practice. What racing does is to compress into a few hours of running the sum of all the difficulties and stresses which would come into an ordinary season of work at a touring pace. From this point of view, therefore, racing is economically well worth while, for it enables information of the most valuable kind to be obtained extremely quickly, and thus progress in design is accelerated.

A number of firms undoubtedly expect others, as it were, to pull the chestnuts out of the fire for them, and it would be ridiculous to suggest that because a designer has no personal connection with racing cars he fails to take advantage of racing experience. In my opinion, those manufacturers who have persistently held to a racing policy have placed most of their rivals under a very deep debt of gratitude, for it is they who have blazed the trail which others have been able to follow. There is an old saying that the racing car of to-day is the touring car of to-morrow. This is true enough if its application be regarded as having a certain latitude in time. It may be, and often is, a year or two before certain lessons learnt in a particular race are materialised in a touring car built for the use of the public.

Generally speaking, however, racing influence is fairly rapid, and if one wanted an example of this, one could not do better than point to the large number of 8-cylinder in line engines which are incorporated in the latest models produced by various car manufacturers. The mere fact that the majority of these bear names which have never been associated with racing does not in the least affect the argument, for it was solely owing to racing conditions that the " straight eight " racing engine, now so very popular, was able to demonstrate its virtue. There is not the slightest question that if it had not been for racing we should have had to wait a good many years before we had the 8-cylinder touring car of to-day.

It has to be admitted that there is racing and racing. All kinds are valuable, but I think it is certain that the most beneficial type of racing is that which imposes on the participating cars conditions which approximate to touring work, namely, road racing. My belief in the value of racing to the advancement of internal combustion engine design is based entirely upon results achieved from road racing.

In order to explain this I must try and illustrate the difference between track racing and road racing, as the two are as far apart as the poles. For track racing, such as is undertaken on a large scale in

America, what is needed is what may be termed a "freak car," one which combines the two essentials of speed and reliability. There is no demand for brakes, gear-box, transmission, or anything else. Also, from the driving point of view, very much less skill is required to drive on the track than to drive on the road. For instance, if you have two cars racing together on the track, the faster of the two, provided that no mechanical trouble is experienced, will invariably win the race, but on the other hand, if the same two cars are entered in a road race and the slower car has a more skilful driver, in nine cases out of ten it will beat the faster car, because a much higher degree of skill and judgment is called for in negotiating corners, changing speed, braking before corners, etc.

In fact, to be successful in a long-distance road race the driver has to have excellent judgment, and be capable of changing speeds without losing a fraction of a second of time. As a result of this, one can easily see that a modern long-distance road race is a far greater test for the car than any track race run under present-day conditions.

In another way it can be said that there are two kinds of racing. There is, first of all, that which concerns itself with the building of highly specialised cars, every detail of which is an individual problem, and which, in the main, bears little resemblance to touring types, and it is essentially this type of racing which tends to improve internal combustion engine design, because every year the cars entered for a race of this nature bear no resemblance whatever to the standard type sold to the public by the company which manufactures them.

On the other hand, there is the type of racing which one meets within the 24-hour race for the Rudge-Whitworth Cup, at Le Mans, in which standard touring cars exclusively are used. Both types are in their way equally useful. It is the function of the one to try out the new idea, and of the other to confirm the soundness of what has already been adopted.

I understand that a bill for the legalising of road racing in England is ready to be placed before Parliament, and that there may be some hope of a successful issue in this direction, though it is at present being opposed by certain gentlemen who have taken upon their shoulders the responsibility of saying that as cars go too fast on the public roads at the present day, they cannot see why motor racing upon such roads should be allowed in this country, as it would certainly lead to more people being killed than there are at the present moment. This, when you come to think of it, is really a hasty statement to make. I feel sure that those who made it know little or nothing whatever about road racing and the wonderful organisations in France and Italy which deal with this specialised form of sport.

Another point which the layman of to-day seldom realises, is that the car which takes him to and from his office in complete comfort and reliability, owes its excellence in many ways to the pioneer firms who have adopted an International Racing Policy, and have by this means discovered the many improvements which have been incorporated in the touring cars produced to-day. Take, for instance, the spare wheel. This can be traced directly to the influence of racing and was brought out after a series of experiments lasting many years, because of the insistent need of producing a wheel on a racing car which could be changed in the minimum number of seconds, so that as little time as possible should be lost.

Let us now consider the more particular manner in which racing has benefited the construction of touring cars. There can be no doubt in the mind of a competent observer that Great Britain stands supreme in the production of the light, economical form of touring car, rated roughly at from 8 to 12 horse-power. This position has been obtained solely because of the long series of racing events which have been promoted for light cars, and in these circumstances I believe it is no exaggeration to say that the small car has made relatively greater progress than the big car.

It is not so many years ago, we would do well to remember, that a 10 horse-power 4-cylinder car was looked upon as an absurd toy. To-day it is a convenient and trustworthy vehicle capable, as has been proved in tens of thousands of instances, of giving lastingly good service in the hands of complete novices, and not only of carrying a light two-seater body, but also of dealing with a comfortable four-seater limousine. The existence of this popular type of car, and the results which it gives are due to racing and to racing alone. Not that the typical 11·9 h.p. engine is a racing motor in any sense of the word, but because, by virtue of racing, designers have learnt how to get all the power they require for touring purposes from an engine of this size without in any way sacrificing the quality of reliability.

If I were asked to state in as few words as possible what is the aim of the racing-car designer which makes his work so valuable, I would say that it is, first and last, the scientific attempt to reduce weight and increase power without depreciating the strength or any other desirable attributes. The greater the power output of a car in proportion to its weight, the better will be its acceleration, its hill climbing, its top gear running, its controllability and its life. Furthermore, the smaller the weight of the power plant in the vehicle the greater the space which can be devoted to passenger carrying. The light family touring car is the comfortable and economical vehicle that we know to-day because designers, through racing, have learnt how to save weight in the engine, and in all other essential mechanical parts. Every pound that they can save in the chassis means less need for power from the engine. This, in turn, means a smaller and lighter engine, and, repaying the compliment, the lighter engine imposes upon the chassis less stress, so that that too can be lightened without loss of strength. It is because saving weight is the principal object aimed at that the racing car has developed the 6-cylinder, the 8-cylinder, and finally the 12-cylinder engine.

In racing work the question of personal comfort is a very subsidiary consideration, and no one would adopt an engine simply on the score of its balance. The multi-cylinder, however, has been created by the racing-car designer because it was only by this means that he could reduce the weight of pistons, of connecting-rods and of similar parts. His idea all along is to get the weight of these down to the very minimum, in other words, by increasing the number of cylinders the designer has found it possible greatly to increase the horse-power that he can get out of an engine of given capacity. It is obvious that this lesson has been fully appreciated by the producers of touring cars.

The straight-eight engine is no better balanced than an ordinary 6-cylinder, but because of its relatively smaller weight of moving parts, it gives a smaller proportional output of horse-power, because it can be run safely up to higher revolutions per minute, and consequently, from the touring point of view, it more nearly approaches the conditions of the engine which requires no gear-box at all.

It is somewhat curious to reflect that road racing, in which the changing of gear is one of the most important figures, and the most frequently called for, has indirectly led to the production of a type of engine which can be driven from 4 to 80 miles per hour on top gear. It must not be forgotten that just as acceleration is demanded in the racing vehicle, so it is equally of importance in the touring machine, and is, indeed, one of the attributes which finds the keenest appreciation. The racing designer developed the multi-cylinder for the purposes mentioned above, but also, incidentally, because it enabled him practically to dispense with the fly-wheel, and therefore to get acceleration of the most enormously rapid order.

To those who are interested in the trend of modern design, the fact that aluminium pistons are used in a large number of standard touring cars is interesting. They may not realise what an immense advance this particular practice represents. It is directly attributable to racing, but to the ordinary motorist in the street, who does not appreciate this fact, it is something of considerable personal value. These very light reciprocating parts mean, first of all, that a greater horse-power output is obtained from the engine, because less power is wasted in moving heavy masses of steel or cast-iron up and down in the cylinders. Here, then, we have the reason for enhanced economy, for, if less power is wasted, it follows that less fuel is wasted.

Again, these light, reciprocating parts mean that the curve of power output, instead of dropping off when, say, 2500 r.p.m. are reached, continues practically unaltered up to 5000 r.p.m. By the selection of a suitable axle gear ratio the engine can therefore be made to give a very much better top-gear performance ; it may indeed be said that the 12 h.p. type of car which was formerly good for very little more than 45 m.p.h. is now capable of obtaining its 60 m.p.h. and, what is of scarcely less importance, is able to obtain these speeds without doing itself any damage.

Other things being equal, the wear and tear upon the engine depends upon the weight of its moving parts, and because these have been so pronouncedly lightened, thanks to racing experience, such wear and tear has been reduced to an almost negligible point. The ordinary motorist has to thank racing for the fact that he not only has a highly efficient engine which weighs very little, but also for the fact that it is very economical in fuel and has an almost indefinitely long life.

It is not many years ago that the suggestion of using aluminium pistons in a standard touring car was regarded as something akin to madness. I believe that if, in 1913, anyone had suggested that a connecting-rod might be made of aluminium alloy he would have been laughed to scorn. These apparent miracles have been performed by the metallurgist because of the pressure which the racing-car designer has consistently put upon him. He has always been asking for something better, lighter and stronger, and the metallurgical scientist has always contrived to satisfy his demands. As a result the progress which has been made in this particular department of endeavour is simply stupendous.

If the ordinary motorist would realise the debt he owes to racing, let him consider another instance. Before the War it was generally necessary, even with touring cars of the very highest class, to grind in the valves every three or four thousand miles. To-day that operation is so rarely necessary that it would be hardly too much to say that once a year is quite often enough for it. This desirable state of affairs is due entirely to the manner in which the steel specialist has responded to the demands of the racing man. The latter found that with the excessively high temperature ordinary steel, which had previously been considered to be good enough for the valves, was burned away at a rapid rate, so that in some cases the valves would not stand up to as much as one hour's "all-out" running. Some new material, therefore, had to be devised, and we have to-day valve steels which will run red-hot, literally, for weeks on end without suffering any deterioration. They do not distort, they do not corrode, and hence, when used in touring cars, they require no attention at all from one year's end to another.

It will not have escaped attention that the overhead valve engine has come into vogue so rapidly that it is now eminently superior to the side-valve type. I will not say that racing created the overhead valve, but it certainly taught designers how to make that type of valve efficient, quiet, and reliable.

The latest racing-car practice embodies two very large diameter overhead valves, enclosed within a hemispherical combustion chamber, with the sparking plug centrally situated. It is interesting to observe that several makes of touring car which have had no connection with racing for many years are now fitted with this particular arrangement.

The supercharger, for which it is not difficult to predict an immense future, owes its existence entirely to racing. At present its use, except in one conspicuous instance, is restricted to racing vehicles, but it is quite certain that this will not always be the case.

Perhaps the most easily recognised manner in which the racing car has reacted upon the touring vehicle is in connection with the use of four-wheel brakes. The front-wheel brake, incidentally a British invention, was first devised as an adjunct for touring cars. For various reasons it failed and fell into disrepute until the racing-car designer got hold of it for his own purposes, eliminated all its weaknesses and faults, and made it a sound practical possibility. To-day it is a standard fitting on practically every modern car, large or small. Its use enhances, to a degree which it would be difficult to estimate, the general safety of road traffic. Had it not been for racing, it is quite certain that we should have had to wait many years before the front-wheel brake attained the position which it holds at present.

Whilst on the subject of safety, it is appropriate to mention how potent has been racing influence upon the lowering of the centre of gravity on ordinary cars. Turn the pages of an old copy of a technical journal, regard the motor-car of, say, 1907, then considered to be the " last word," and compare it with the vehicle of to-day. The very first thing one notices is that the latter is much lower and nearer to the ground. This steady descent owes its existence to racing influence. For cornering at high speeds the low centre of gravity is essential, and incidentally the same factor makes not only for stability, but for comfort. One would not, at first glance, be prepared, as a rule, to admit that racing experience has improved the comfort of the ordinary touring car, but when one looks into the matter one is convinced that it is actually the case.

I have often heard it advanced that with modern motor racing the element of sport is largely discounted by the fact that the mechanical side plays such an important part in the issue. That point of view is natural enough, nevertheless the fact remains that far from depreciating the personal element, it is this very consideration that accentuates it. The successful racing car, other things being equal, is that which goes nearest, and stays nearest, to breaking point, yet never actually crosses the Rubicon. To keep to that magic 99·9, yet never to touch the hundred, is the province and the particular part of the driver. A single error of judgment when all the conditions are tending to urge the driver to throw judgment to the winds may mean certain failure. A shade too much conservatism may well mean ignominy.

Time was when all motor racing was sport, but just as the pure science of the mathematician becomes the applied science of the laboratory and ultimately the foundation of some great house of industry, so motor racing has either degenerated —or risen—until its commercial aspect has to a certain extent obscured the sporting side.

This last, of course, must always exist, but year after year it is being thrown more and more into the background. Whether or not motor racing is a sound commercial proposition (whatever that may mean !) it is not for me to say, for there are undoubtedly many racing firms who have found it anything but this. As on the turf, much depends upon, first, the reason why the car is entered, secondly the nature of the people who have entered it, and thirdly their reasons for doing so. Fortunately for the sport of motor racing, neither track nor road has ever been the scene of a great scoop. On the other hand, motor racing, shorn of its commercial relationship, would, from the point of view of the firms entering their cars, lose a great proportion of its interest. A firm does not race to make money, that is, if it is wise. It races to find out information which may ultimately make money for it.

Certain it is, however, that the race track is an infinitely more valuable and certain testing-ground than can be devised within the surroundings of a factory, and the firm that has never raced has no idea of the actual capabilities and limitations of its own product. Here it is that the human equation comes in, for under the stress of competition the driver of a racing car will allow himself to be carried away by his immediate surroundings and conditions, whereas the technicians who stand beside the test bench in the factory will remain calm. They will run their engine for a second or two within a decimal point of failure, but they will do it in trepidation.

Out on the open road, during the race, with a rival car to overtake, and time to make up, the racing driver will for a moment or two forget his instruments which are his danger signals, the excitement of the moment will overcome him and he will go " all-out," and it is upon what happens when he does this that the commercial proposition depends. Failure means " We have gone too far in this or that particular direction," success means " Here are enormous possibilities."

One reason, incidentally a very sound one, for the decline, if I may use such a word of the sporting side of motor racing, is the entry of the professional element. Time was when such a thing as a professional racing driver was practically unknown, and motor racing was undertaken in the main by enthusiastic amateurs who bought their own racing cars, and tuned them up themselves ; but as the trend of racing-car design altered, and the element of theoretical and mechanical knowledge necessary for the drivers of the cars became more and more pronounced, so the type of driver began to change, and now it has reached such a point that the average amateur, however good a driver he may be of the ordinary type of touring car, is totally useless when put up on a modern high-efficiency, supercharged, racing car, the engine of which runs at anything between 6 and 8000 r.p.m.

Another point, also, which has tended to spoil the sporting side is the question of money prizes for the various races. It is rather natural, and I believe it is the same in all forms of sport, that when the ultimate goal to be achieved carries with it a large cash prize, the men competing for this prize will go to greater lengths and sail closer to the wind in order to attain their ends than if there was nothing to be attained beyond the honour and glory of winning the race.

In England to-day, it is a regrettable fact that there are practically no racing-car drivers in the same class as the professionals to be found in France, Italy, Germany and America. The reason for this is largely because road racing as a form of sport is not authorised by the Government in England, and consequently the many amateur drivers who would like, in fact who would give anything, to drive a racing car for one of the big firms in the international events abroad are unable to put up the same showing as a professional driver in these events through lack of experience in road-racing work.

As far as the Sunbeam Company is concerned, year after year the same question arises—" Where can we get English drivers ? " and the reply is always the same—" Who is there with sufficient experience of road racing ? " As a result, foreign professional drivers have to be engaged to drive British cars in the international races abroad.

The profession of " racing driver " is, to my mind, one of the hardest in the world, because it calls for special qualities not present in the average individual with aspirations in this direction. First of all, he must be young if he is starting in the game, and when one is young one's enthusiasm as a rule overcomes one's better judgment in many ways, with the result that when a young driver is taken on he wishes invariably to impress his employers with the fact that he is filled with the quality usually described as " guts," and in most cases this proves to be his downfall.

Nobody can get into a racing car, drive round a road circuit, and put up the same speed for that circuit as an old hand at the game. One must begin slowly and work up one's speed as one gets used to the various sensations which are experienced. No designer, or head of a firm, can afford the responsibility of taking on a young and inexperienced driver, even though he may have all the enthusiasm in the world, and put him up to drive against seasoned professionals on a car which has cost that firm some thousands of pounds to build. The financial responsibility alone is too great, the cars themselves are seldom insured because the rates of insurance payable are so high as to be almost prohibitive, and one error of judgment, even though the driver may escape with his life, means that a new racing car will have to be made.

Most of the well-known professional drivers, whose names are household words to-day, have risen to their present positions by sheer hard work. In nine cases out of ten they commenced their careers as mechanics with the earlier drivers who have now ceased to race.

Take, for instance, the case of Albert Divo, who is now regarded as France's leading professional. He was originally with Monsieur Despujol as a mechanic on the racing motor-boats which were produced by the firm of that name. Mr. Coatalen noticed this boy—he was a boy in those days, being about twenty-seven years of age—and induced him to join the racing team of the Sunbeam Company as a mechanic. This he did in 1920, going to Indianapolis in 1921 as mechanic to Rene Thomas on one of the 3-litre Sunbeams. He accompanied this driver as his mechanic to all the races throughout the 1921 season, and in 1922 was mechanic to Lee Guinness in the Grand Prix at Strasbourg. Thus he gained invaluable experience as a racing mechanic.

He was then given the wheel of a racing car at the end of 1922, from which point he has worked his way up, driving various types of cars, to the position which he holds to-day. His case, I think, is a typical one.

CHAPTER IV

ON ACCIDENTS

Causes of crashes—Nerves—Bad surfaces—How Ascari was killed—Biaggio Nazzaro's death—Ferrari's marvellous escape—A car thrown into the air—See-sawing over a precipice—Dario Resta's fatal crash—How to take corners—Tyre bursts.

THERE is no game on earth where "a little" counts so much as in motor racing. The driver who goes nearest the limit without ever actually crossing the Rubicon wins his race, and the difference between stopping at the brink and crossing the fateful river is so slight that only superb judgment can sometimes pull him through safely.

Often St. Christopher prays in vain, and the ranks of those pioneers who have given their lives to help make cars the safe and reliable vehicles they are to-day are swollen by yet another recruit.

It is the same in all branches of engineering where the ideal has not yet been attained. There are always the pioneers who, for the love of the game, the thrill they get out of it, are working, experimenting, everlastingly striving to improve that which already exists, till in many cases a tiny error of judgment, a momentary dulling of the senses and—the inevitable result.

In motor racing the toll is higher than in any other sport. Comparatively few big races are run without an accident. In the past it was usually the mechanic who was killed. It is difficult to explain just why this was so—perhaps because he was almost invariably the one who was thrown clear, and, if the car was travelling fast, the force with which he hit the ground was, in itself, usually enough to kill him outright. The driver is luckier—he has his steering wheel to grip which helps to hold him in position, and, if he can only succeed in keeping his head when he realises that a crash is inevitable, and stay in the car instead of making a wild endeavour to throw himself clear, he will, in nine cases out of ten, escape with a shaking.

Modern racing cars are very strongly made, and in all the many crashes I have seen the cockpit of the car has seldom been damaged and the shell of the body has not been crushed.

It is a curious thing that, as a rule, only the very fast and the very slow crashes have proved fatal—those happening at speeds of from 40 to 100 miles per hour have resulted in severe shakings for both the occupants.

Broadly speaking, accidents can be divided into two categories, those which are due to an error of judgment on the part of the driver, and those which are due to some vital part of the car breaking under excessive strain, caused by faulty design or material.

By far the greater number arise from the former cause, and these are, comparatively speaking, seldom fatal, because the driver still has the power of his engine, which, if judiciously used at the right moment, may just help to tip the scales in his favour.

But when any portion of the car gives way, due to crystallisation of material or weakness in design, such as steering, axles, or chassis frame, there is absolutely nothing to be done, except to sit and wait for the inevitable. Happily the suspense is not long, and the driver scarcely has time to realise that something has happened before the crash comes.

Accidents usually happen either at the beginning of a race, or else just before the finish.

The reason is that at the start of a race everyone is keyed up to a high state of nervous tension and the road appears quite different from what it did in practice, because of the tens of thousands of spectators who assemble at the corners, completely hiding the landmarks picked out by the drivers in practice to warn them of the approach of each corner. In his eagerness to obtain the lead and be first past the Grand Stands on the first lap a driver may take a corner too fast—a wild application of brakes, too late to be of any use—a frantic effort to correct on the steering, a skid, and the car overturns.

Towards the end of the race, when all the senses are dulled by hours of speed with nerves at breaking-point, there comes that momentary lapse when the mind ceases to function in unison with the hands and feet, the accelerator pedal is left depressed three-fifths of a second too long—and the result is the same.

Immediately the accident happens wild rumours circulate about the cause. Scores of eye-witnesses appear from nowhere, each with his or her different story, and so it grows, till eventually the truth becomes so distorted that the bare facts are submerged in a sea of conjecture and criticism.

It is almost impossible to say definitely what caused a bad accident, owing to the speed at which it happens. The onlooker's mind is not prepared for it, and it has happened before he has had time to realise it.

Take, for instance, the accident in the 1925 Grand Prix at Montlhery, which resulted in the death of the Italian driver Ascari. About five different versions of this appeared in the Press at the time, and eye-witnesses galore turned up in the hopes of centring interest in themselves and taking a momentary stroll into the limelight.

Personally I disagreed with every published version of this accident, because I had my own theory, springing from a knowledge of the man Ascari, his temperament, his car, the corner where it happened, and the circumstances leading up to the actual moment when he turned over.

Ascari started with the number 8 on his car, and almost immediately obtained the lead which he retained till his fatal crash. He was driving excessively fast. There was a curve on the Montlhery circuit which could be just taken at 120 m.p.h., and Ascari had been negotiating it successfully at this speed for some time.

Suddenly it began to rain. Ascari arrived at the corner at the same speed, and, of course, found that on the wet surface there was no hope of him getting round.

The car simply turned sideways and went straight on, crashing into the protective palisading at about 110 m.p.h. It then turned over and over, bouncing along the ditch at the side of the road, finally coming to rest upside down nearly 300 yards from where it left the road. Ascari, terribly injured, died on the way to hospital.

On the other hand, when Biaggio Nazzaro was killed in the Grand Prix in 1922, it was due to a breakage in the car, and could not have been avoided.

He had only ten miles, or thereabouts, left to go, when suddenly, as he was travelling "all out" down the fastest section of the circuit, either his front or his back axle—no one ever found out which—snapped clean in half.

The car hurtled end over end along the middle of the road with a horrible crunching noise, eventually finishing up at the foot of a tree, a tangled mass of twisted metal. The driver was killed, but the mechanic escaped with superficial injuries.

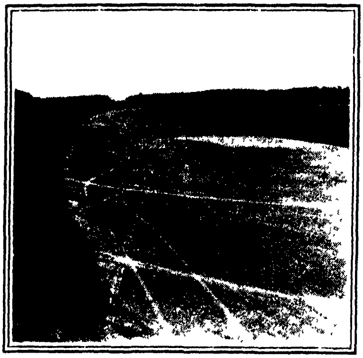
The Grand Prix de France at Lyons in 1924 will always stand in my memory as one of the most eventful races of my experience. It undoubtedly had its humorous side, and equally it came near tragedy. I had an Italian mechanic riding with me at the time.

Half-way through the race Lee Guinness, who was ahead of me, suddenly burst a tyre. I saw a cloud of dust, smoke, and stones, with great chunks of rubber shooting into the air. The next moment a flying piece of tyre hit the mechanic across the head. He collapsed as though he had been sandbagged. I had to drop him at the next stop and take on another.

A little later in the same race we were approaching a dangerous corner which could only be taken with safety at about ninety miles per hour. The fields on either side were rough, and studded with boulders and gorse-bushes.

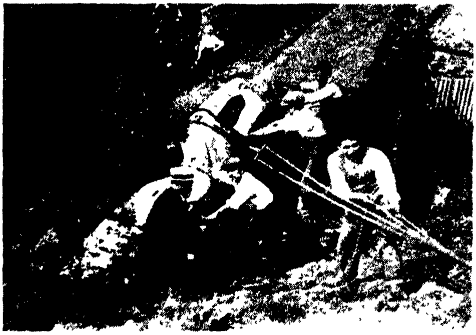
The driver ahead of me was on a Fiat car, and just as we neared the corner he must have realised that someone else was very close behind him, for

THE DIFFERENT PHASES OF J. CHASSAGNE'S CRASH IN THE 1922 "TWO HUNDRED MILES RACE" AT BROOKLANDS



SKID MARKS ON CONCRETE, SHOWING HOW CAR LEFT THE TRACK

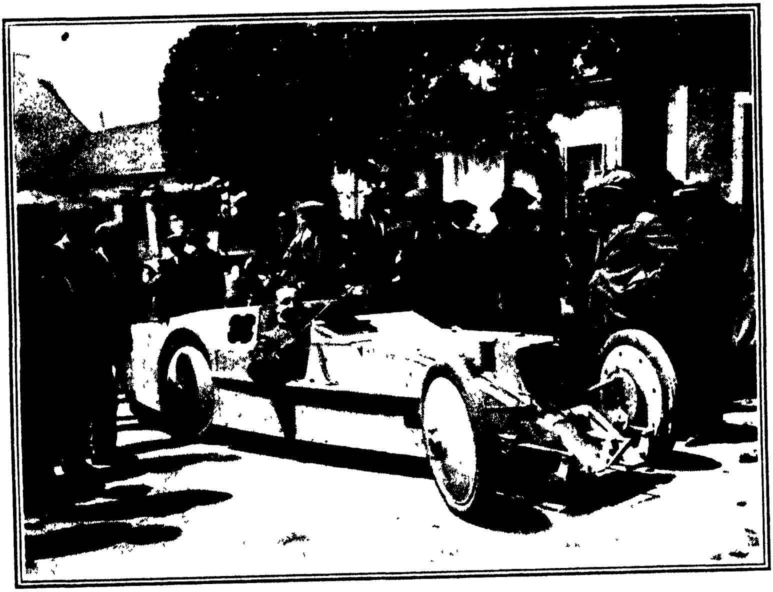
THE CAR VIEWED FROM BELOW



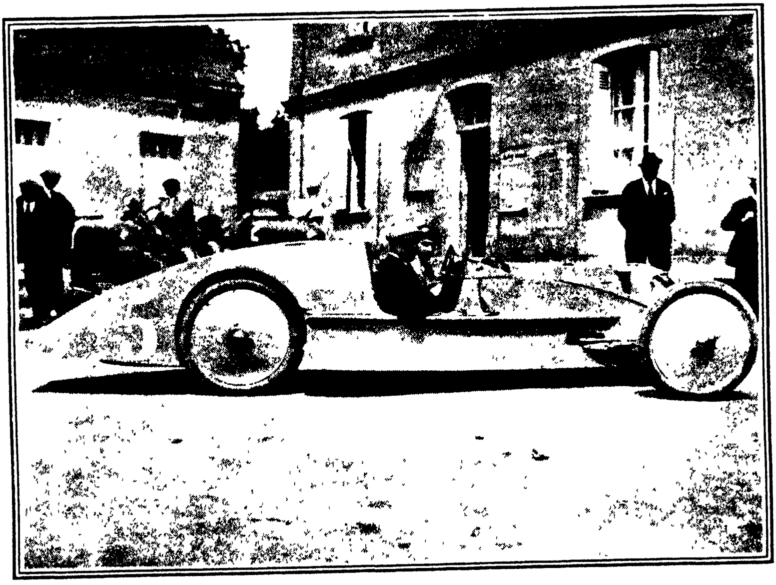
SALVING OPERATIONS

LOOKING DOWN ON THE CAR FROM THE TOP OF THE BANKING
DUTOIT STANDING BESIDE IT

TYPES OF CARS IN THE 1923 GRAND PRIX



ONE OF THE VOISINS, DRIVEN BY ROUGIER



ANOTHER DRIVEN BY DURAY

he glanced round. That brief second nearly killed him. He trod on the accelerator, tried to round the corner far too quickly, missed it, crashed through the fence into the field, and hit an enormous boulder head-on.

The car shot into the air, turned over, dropped both driver and mechanic into a gorse-bush, and crashed some yards further on. Neither the driver nor his mechanic was badly hurt.

An even narrower escape in practising for the same race was that of Bordino, who, in my opinion, is the finest road driver in the world. At one corner there was a sheer drop of 100 feet into a quarry. This was guarded by a palisade of railway sleepers on end, and was safe enough if you did not go round it too fast. Bordino tried to.

His car left the road, crashed into the railway sleepers, uprooted three or four, and hung over the lip of the quarry, its two front wheels resting on nothing and the whole body rocking to and fro like a see-saw. The slightest movement forward would have sent it hurtling down.

Bordino, who, by a miracle, had not been thrown out, climbed quietly and calmly out of the back, none the worse. He had escaped a serious crash and probably death, not only by inches but by ounces.

Another escape, either by luck or Providence, to which I owe my life, occurred on that terrible day at Brooklands in 1924, when poor Dario

Resta was thrown through the corrugated iron fence and killed.

Resta and I had gone down to try to set up two new series of records, one short and one long.

Resta wanted to go down to Eastbourne that day to see his wife, so he asked me if I would mind if he did the short series.

He started, and in the third lap, at 125 miles per hour, his right-hand back tyre became deflated and wrapped itself round the back axle, locking both wheels. No driver could have saved it.

The car spun round and round, plunged backwards through the iron fence, and the unfortunate driver was instantly killed. His mechanic, Perkins, was badly burned but escaped with his life.

Had it been a soft springy, wood fence, such as is used abroad, it would probably have saved his life. The car would have bounced off. I have seen scores of lives saved by such fences. Corrugated iron should never be allowed.

I do not want to dwell morbidly on fatal accidents, but I have often been asked to explain what happens to great racing cars which have been wrecked and killed their drivers. They are rebuilt, almost invariably, tested, trued, and used again. It must be remembered that they cost thousands of pounds, and are seldom so smashed up that every part is useless.

A notable exception was poor Parry-Thomas' car, which was buried in a "grave" on the sands at Pendine after it had killed him.

Apart from error of judgment and mechanical failure, in which, of course, I include tyres, I should say without hesitation that another palpable cause of accidents is variation in the road surface. No matter if it is a wet or fine day, there are few road circuits of which I have any knowledge where the surface is practically the same throughout. It will be macadam here, tarmac there, bits of *pavé* further on. When all these are dry it may be easy enough to get a tyre hold. But with varying degrees of wetness they have also varying degrees of slipperiness.

A corner, for example, that on the seventh lap, although dampened by rain, gave a splendid tyre hold, may be like butter on the eighth lap ten minutes later.

Then, again, there are bumps. Sometimes, although these may be comparatively small, they nearly upset the stability of a car, and especially they have a tendency to start a skid, particularly on turning. Quite minor bumps will lift a racing car's front wheels clean off the road, and it is always on the cards that, whilst the front wheels are in the air, the driver, whether he knows it or not, will slightly turn them. When they come down again, a violent sideways force is applied to the front of the car, and if the wheels have not a good grip on the road, this may be an extremely difficult thing to check.

There is no doubt, of course, that, much as one hates to say so, a large number of accidents are caused not only by lack of judgment, but definitely by bad driving. By this I mean that the wrong tactics are employed. Time after time one sees even experienced racing men taking corners in a manner that has long been proved to be dangerous.

The fundamental rule in this connection (and I can hardly imagine any circumstances arising which would justify a departure from it) is to restrict one's braking absolutely to when one is travelling on a straight course. When approaching a corner one slows down, and at the same time makes the necessary gear changes to prepare for accelerating rapidly away from the corner. By this means the engine itself is used as a brake. When, therefore, one comes upon the actual turn, the motor, on second or bottom gear, as the case may be, is driving the car, which is ready instantly to spring away the moment the road provides an opportunity for doing so.

When one takes a corner in this way one is practically certain to avoid the danger of skidding. Even if an incipient skid should start, the fact that one is accelerating and not braking gives one the facility of checking one's speed almost instantaneously.

In contradiction to this method one often sees drivers approaching a corner at such a pace that they have to brake hard to take the turn at all. Manifestly in these circumstances a skid is likely, so likely in fact, that it will frequently occur even though the road is dry and in good condition.

It is difficult to understand why the rule to which I have referred is ever broken, for observation clearly shows that to slow down first and then to accelerate round a corner is a time-saving manœuvre as compared with slowing down steadily until one is round the corner and then accelerating.

At one time it was commonly supposed that the deflation of a tyre was tantamount to the signing of the driver's death-warrant, but this is by no means the case, first because genuine bursts hardly ever occur, and secondly because if they *do* occur, drivers have acquired enough knowledge to know, more or less, how to deal with them.

The golden rule for tyre punctures is, when they occur, never apply your brakes. A sudden or violent application of the brakes is apt to pull the tyre off the rim, and if this does not happen, as, in fact, it cannot with modern racing tyres, then it is apt to upset the stability of the car.

Poor Dario Resta was a victim of tyre trouble, as I have already described.

Another classic instance of tyre failure was that of Chassagne in the 200-mile race when, as I have described elsewhere, he went over the edge of the track, he and his driver safely emerging from a crash that looked as serious as it could be. This car had no differential, and it is an open question whether this constituted a benefit or disadvantage.

When tyre trouble occurs, there is no doubt that the directional stability of a car which has a solid back axle is very easily interfered with, particularly when one is entering the banking from the straight, as the four wheels are quite likely to be submitted to serious lateral strain, owing to the fact that the straight cannot be merged into the banking with absolutely mathematical precision. In short, the inner wheels are less banked than the outer ones, which involves an uneven distribution of load on the tyres.

As will be gathered from other chapters, strange things happen in the way of mechanical trouble to racing cars.

Here are a few further instances :

Masetti had a bad crash at San Sebastian, brought about by the fact that the cable of the brake slipped off its guiding pulley. The immediate effect was, that one of the front wheels became locked, thus rendering the car utterly uncontrollable. This actually occurred as he was crossing a bridge near the village of Hernani. The car slewed round in the road, hit the parapet of the bridge, and went through a stone wall into a field, both driver and mechanic escaping without a scratch.

CHAPTER V

THE GRAND PRIX

A brief history of the Grand Prix, the world's greatest race—Preparations for the race—How the circuit is chosen—The stop-watch fiend—" They're off ! "

THE name " Grand Prix de l'A.C.F." has no particular significance or meaning to comparatively few people outside those interested in motor racing, and so, before describing the race and the preparations necessary for it, it would be as well, perhaps, briefly to illustrate its history.

The Grand Prix of the Automobile Club of France is the blue riband of motor racing and dates back to 1906, when the first of the Grand Prix races was held over the Le Mans circuit. It was held on July 26th and 27th, over a distance of 783 miles and was won by a gentleman who rejoiced in the unpronounceable name of SZISZ on a Renault car, Nazarro being second on a Fiat.

The Grand Prix was instituted by the Automobile Club of France to replace the Gordon-Bennett Cup race which had been a yearly event since 1900. When the late Léon Thery won this race in 1904 and 1905, driving a Richard Brasier car, the French Club began to use its influence to eliminate the Gordon-Bennett race and to substitute another called the Grand Prix of the Automobile Club of France, with rules slightly different but more favourable to French contestants.

So great was the influence of the French Club then that it succeeded in carrying through its programme, and the Gordon-Bennett, as a race, ceased to exist.

A French victory was scored in 1906, as I have said, but 1907 and 1908 proved disastrous to the French industry, for Nazarro romped home an easy winner in 1907, while in 1908 Germany was responsible for the first three cars over the line. These were a Mercédès driven by Lautenschlager and two Benz. The race was held at Dieppe and Lautenschlager's average for the 478 miles was 68·9 miles per hour.

The results of these two years had such a far-reaching effect on the morale of the French Automobile industry that the Club did not hold the race in 1909 or 1910 owing to lack of French entries.

It was revived in 1911 but with not much success, for a Fiat car again won, though the foreign victory was to a certain extent mollified by the fact that the driver, Hemery, was a Frenchman. In this race Maurice Fournier was killed on the straight leg of the circuit through his front axle breaking, and a monument stands to-day at the spot where he met his death.

In 1912 a two days' race was organised over the Dieppe circuit, again over a distance of 956 miles. Two races were actually run off at the same time, the second and smaller of the two being for cars of a limited engine size. This race marked the successful debut of the Sunbeam firm in Continental racing, for the three cars they entered finished first, second, and third, driven by Rigal, Resta, and Medinger.

The Grand Prix proper was won by Georges Boillot on a Peugeot at an average of 68 m.p.h.

The successful Sunbeams and Peugeots were designed by Messrs. Coatalen and Henry.

Again in 1913 Georges Boillot won, but this time over the Amiens circuit, Jules Goux finishing second on a sister car.

In 1914 the German Mercédès finished first, second, and third, the race being the scene of a tremendous duel between the Mercédès and Peugeot cars, Boillot who had led for many laps finally being worn down by the superior organisation of the Mercédès team.

This was the first occasion on which a team of racing cars were driven to a definite schedule and with a definite purpose in view. Two cars out of the five entered were specially tuned up to go all out after the Peugeot drivers and drive them off the road, the remaining three cars being held in reserve with instructions to drive to a certain definite speed, and not to exceed it, unless ordered to do so.

The need did not arise, for the prearranged tactics of the Germans bore fruit before half the race had been run, the Peugeots being virtually out of the running with tyre trouble, and Lautenschlater won at an average of 65 m.p.h.

To-day the Grand Prix is a " race of invitation," certain countries being asked to send teams, and the circuit is chosen in the following manner:

It is understood, to begin with, that the Grand Prix attracts a very large number of people, who spend money. Consequently, it is of distinct commercial value to the locality in which it takes place and, in order that full advantage may be taken of this fact, the Automobile Club of France at the beginning of each year ask various districts to bid against each other for the privilege of having the race held in their district. Each district must also, however, provide a road circuit of a reasonable distance, or length, in its own locality, for approval by the Engineers of the Commission Sportive.

This road circuit must be so chosen that it offers extreme examples of everyday road conditions, such as a long straight stretch for high-speed work, a winding hill for acceleration, and a series of sharp corners to test the brakes. Consequently, during the race every portion of the competing cars is tested to its utmost, and any weakness in design immediately comes to the surface, resulting in the breakdown of the car in question. It is this way that road racing is of incalculable value in the development of automobile design.

When the various bids are received, the Commission Sportive sends out its engineers to inspect each individual circuit, paying particular regard to the accommodation available for visitors in each case, and eventually choosing the one which proves most satisfactory from all points of view. Their choice is then made public, and from that moment the task of the manufacturer who enters his cars for the race begins.

Let us take the case of the Sunbeam Company as being to a certain extent representative of what is done by all firms competing in this race, although not altogether typical, because racing with the Sunbeam is taken very seriously and the preparations are more thorough than is usually the case.

It is invidious to name certain concerns, but this case is exceptional because the Sunbeam Company is the only concern in Great Britain which has a team of professional drivers and enters its cars in big international events abroad.

So soon as Captain Irving, who is in charge of the organisation of the Sunbeam, Talbot, and Darracq racing departments, is informed of the locality chosen for the Grand Prix he details some of the personnel of the racing department to go to the circuit and report upon it and also arrange for the accommodation for the racing team when it arrives before the race for practice, and for garage accommodation for the cars.

Upon arriving at the circuit chosen, the drivers and engineers proceed to do several laps in touring cars, specially provided for this purpose, and observe the characteristics of the road with a view to determining the most satisfactory axle ratios to enable the racing cars to make full use of their powers of acceleration, and in order that the ratio of engine revolutions to road wheels may be so arranged that the cars will be running at 90 per cent of their maximum power output throughout the race.

In other words, supposing you drive a car over a given stretch of road with too high a gear ratio, the engine never develops its full r.p.m. and, consequently, is not giving off its maximum power.

So soon as these decisions are arrived at, the question of garage accommodation for the team, mechanics, and cars is gone into. This question is usually rather a difficult one, because the inhabitants of the locality are wont to ask abnormally high prices for accommodation of this nature, well knowing that each firm will endeavour to place its team as near the circuit as possible in order to avoid unnecessary wear and tear on the cars going to and fro and during the practice periods.

When these details have all been satisfactorily decided, the representatives of the firm return to the factory to make full use of the data obtained in the building of their cars, which is at this time progressing in the experimental department.

So soon as the first car is completed, one of the drivers is detailed to take this car down to the circuit and try it out with a view to seeing whether the gear ratios arrived at in theory prove satisfactory in practice, and at this point it may be of interest to the reader to know that this constitutes one of the most dangerous features of the whole business, because the circuit is naturally unguarded and the driver is obliged, in order thoroughly to test his car, to travel at the maximum speed of which it is capable, in other words, speeds in excess of 125 m.p.h., and, while doing so, risk meeting carts, lorries, or motor-cars, or any other vehicle which may be using the road at the particular time when he is testing the car.

Provided these tests prove satisfactory the car then returns to the experimental department and the assembly of the other cars is proceeded with.

In the Sunbeam Company the measurements of the individual drivers are always taken and each body specially made for each, so much so that A often cannot drive B's car or vice versa. The reason for this is that in a long-distance race personal fatigue plays a very important part, and if a driver finds himself cramped or uncomfortable in the car, his mind is not wholly concentrated on his driving. Consequently he does not go either so fast or so well as if he were perfectly at home and comfortable.

Little details like this, although they may appear of secondary importance, have a definite bearing upon the result of the race. Five hundred odd miles is a long way at the best of times, and a racing car is not the most comfortable method of travel; consequently it behoves the designer of the cars to reduce the strain imposed upon his driver to a minimum, and comfort plays a very large part.

Finally comes the great moment when the drivers are officially informed by the company that their cars are completed and ready for the road.

Upon arrival at the works they are ushered into the experimental department, where they see the four cars, resplendent in their new coats of paint. At this juncture several hours are invariably spent while each driver overhauls his car, examining and commenting upon all its various details and telling the chief engineer what things he would like altered to suit his personal requirements, such as the position of the change-speed lever—it may touch his knee in top speed—or he may not be able to see No. 1 revolution counter owing to the spokes of the steering wheel being in the way, etc.

Eventually all the detail work is settled and the cars start on their first journey from the works at Wolverhampton to the Talbot works in Paris.

During this journey (they are always driven by road) any details which may be wrong are made apparent and noted by the drivers. Upon reaching Paris they are taken to await the arrival of the racing team from Wolverhampton, who then stay in Paris for about a week putting finishing touches.

Finally the cars and drivers, the racing team consisting of about 20 mechanics, the designers, the draughtsmen, the engineers, the spare parts, tools, the service cars and lorries leave for the circuit.

This drive to the circuit is nearly as exciting as the race itself. All along the road you see people you know and hear bits of news about the prodigious speed of the Fiats, the " reprises foudroyantes " of the Delages, and so on, all absurdly exaggerated but all helping to keep up the excitement to fever pitch, and, as the excitement increases, so does the speed at which one travels, so that eventually it develops into something not far short of a race amongst the team to reach the circuit first.

In 1924 when the Grand Prix was at Lyons, Mr.

Coatalen arrived in a very agitated state, because all the way from Paris to Lyons he was informed in each village of the progress of the race between the Sunbeam team—how at one village No. 7 had just passed No. 14, but No. 1 was only just behind and catching up fast! (The racing numbers of the cars that year were 1, 7, and 14.) Consequently Mr. Coatalen scarcely expected to see complete cars when he arrived. However, we all assured him that these reports were grossly exaggerated.

It is, however, after the first morning of practice that the best or the worst is known—one's hopes are blasted or one's fears realised, because for the first time you see and meet your competitors on the circuit and under the conditions in which you will meet them on the day of the race.

Just at this precise moment another species of creature appears, whom I personally call "the stop-watch fiend." He is a being that you have probably never met, and most certainly never want to. He will insist on telling you your time for the circuit (it is never correct), and other people's times as well. We were all attacked in turn by one of this species at Lyons, who made everybody's time about "11 minutes," quite regardless of the fact that an inaccuracy of 10 seconds for the 14½ miles made a difference in the average speed of the car for this distance of about 4 miles per hour. However, all these little details help to add to the general enthusiasm and keenness about the race itself.

At this point it might be interesting to say a few words on the interest taken in the Grand Prix by the French Press. For days before the race at Lyons, which is about 300 miles from Paris, people were arriving not in ones or twos, but literally in thousands, and all those who could not get accommodation in the hotels available were camping out in the fields.

One reads with amusement some of the reports of the race which appear in the English daily Press, often inaccurate and usually referring to the race as a "Motor Derby"; then one contrasts in the *Matin* and the *Petit Parisien*, to mention only two of the leading French daily papers. One then immediately realises the interest taken in road racing by the French public.

This interest is increasing, as can be seen from the Grand-stand accommodation provided each year for the vast crowds which assemble. The interest never decreases because this race is never a certainty. Like the Grand National, the conditions are too stiff and the element of luck too pronounced for even the fastest cars and the best drivers to be anything like certain of winning. Furthermore, there is the international element, each country being invited to send a representative team or teams to compete, and each country being allotted a different colour for its cars—thus

England is green, Italy is red, France blue, Germany white.

Finally comes the day for the weighing-in and checking-up of the competing cars. This has to be done, because otherwise it would be possible for manufacturers to enter a car in this race of double the engine size stipulated, and, in fact, there are in existence rumours, not altogether with foundation, of this having been done in the past, when the regulations were less strict than they are at present.

Weighing usually takes a full day and is one of the most trying ordeals before the race itself, because of the number of papers, data, insurance policies, etc., which have to be produced. The weighing-in is arranged in a series of controls, at each of which an engineer of the French Commission Sportive is put in charge. The cars are then passed from one control to another, and finally, when everybody's mind is in a whirl, the attack by the Press representatives and photographers commences.

The drivers and their cars, the designers and the personnel of the company are photographed in every possible position, the cars being photographed side-ways, front-ways, end-ways, from the top and from the bottom. They are then released and driven back to the garage for the last adjustments and preparations.

During the night before the Grand Prix it is scarcely possible to sleep owing to the noise of cars and people arriving. Everybody seems to think he owns a racing car, whether it be a two-cylinder Renault or the latest Hispano-Suiza. Everybody opens his cut-out, or takes off his silencer altogether, and makes as much noise as possible just to liven things up a bit.

Next morning the cars leave for the start at about 7.30 and the feeling from the driver's point of view is now one of relief rather than nervous excitement—relief because he knows that all the trials and tribulations of the practising and testing are finished, and that now the result of all the work he has put into his car during the preliminary periods will be tested in the race.

But the wait from 7.30 in the morning to the zero hour, if one can call it that, is usually a nerve-racking period, and the mental characteristics of the drivers of the different nations usually make this apparent. The French are always excitable, rushing about with *bidons* of water, cans of petrol. The Italians do a lot of shouting and gesticulating, while, speaking for ourselves, the Sunbeam team usually remain morbidly silent by their cars.

Finally, the starting marshals appear, and the cars are pushed to the starting-line and assembled in numerical order, this order having been arranged previously by the drawing of lots for position. Then the starting marshal summons the drivers to give them the last instructions and explain the rules under which the race is to be run. The pilot car appears, everybody gets into their seats, the engines are started up, the roar of open exhausts steadily increases, the starter's flag drops —and the Grand Prix has begun!

CHAPTER VI

MY FIRST YEAR'S RACING

My first year's racing difficulties in obtaining a car—My first road race; lessons I learned—The Coupe des Voiturettes—The tragedy of the Spa Hill climb—Driving on road and track compared—Tyres.

WHEN I left the Service after the War I determined that I would go in for motor racing seriously. It was not difficult to decide with which company I had best associate myself for this purpose. There were, at that time, very few motor manufacturing concerns in Great Britain who were taking racing at all seriously, and pre-eminent among these was the Sunbeam Company.

The person principally responsible for this state of affairs was Louis Coatalen, whom I do not hesitate to describe as one of the outstanding figures in British automobilism. Few designers of cars unite technical ability with a sound business sense and sufficient dynamic energy to bring them into a high position of control in the motoring industry. Mr. Coatalen is certainly one of them, and it was owing, undoubtedly, to his consistent advocacy of a racing policy, both as a means of publicity and a field for technical research, that for years the Sunbeam Company was the only British competitor on European roads and tracks.

Although Mr. Coatalen knew nothing about it at the time, I had made up my mind that I would become one of his racing team. I lost no possible opportunity of representing my case for his consideration, and was scarcely surprised to be told very distinctly that I had got to do something first before there was even the remotest possibility of my satisfying this ambition.

I therefore purchased an old Opel racing car. This had been designed for the 1914 Grand Prix, in which, driven by Karl Joerns, it had finished eighth. It was equipped with a four-cylinder engine, having four valves per cylinder, and taking it by and large was a very decent motor-car. It was one of the two white Opels which had appeared at Brooklands on the August Bank Holiday immediately before the outbeak of the War, during the whole of which it had remained stored away in England.

This Opel was raced fairly consistently at Brooklands in 1920, and succeeded in winning several races. I also ran it in the Southend and Southport speed trials and at the Kop Hill Climb.

The possession of this car was an interesting experience, as I could not afford to have the services of a skilled mechanic, and consequently had no option but to do all the tuning up myself, to say nothing of introducing minor modifications in accordance with my own ideas.

During this season I had several opportunities of meeting Mr. Coatalen at Brooklands and elsewhere, and never did so without importuning him to give me the big chance for which I was looking. He objected, time after time, that although I seemed to be able to drive a car fairly reasonably on the track, I was woefully lacking in road experience, and he made no bones about telling me that he did not believe I should be any good in a road race. I think it was even possible that it was solely as a means to get rid of me that Mr. Coatalen finally agreed to let me have a car. He made no secret of the fact that he thought I should be a failure.

The fates were propitious, however, because Mr. Coatalen was responsible for the entry of five cars for the Grand Prix of 1921. Two of these were 3-litre Sunbeams, to be driven by Rene Thomas and André Boillot, the third was a Darracq driven by Count Zborowski, while the fourth and fifth were Talbots of precisely similar design to the Sunbeams, and in point of fact made in the same factory. These were to be driven by K. Lee Guinness and myself. The understanding was, that if I contrived to finish the race within the time limit, I might be taken into the team on probation.

This Grand Prix was held at Le Mans in June, and it was the first year upon which this circuit had been used. As a racing circuit it was easy, for there were no really difficult corners to negotiate, and the course was everywhere reasonably wide, offering plenty of opportunities for passing and repassing. On the other hand, the people responsible for it had evidently no ideas whatever of the wear and tear which a racing car can impose upon a road. After a few circuits the road, especially at the corners, was cut up in a shocking manner, and the number of loose stones was incredible.

This was the first big road race after the War and its results provided many valuable lessons, one of which was, that there is an art in making racing-car tyres which can very easily be lost if it is not maintained by practice. Our cars, the engines of which had 8 cylinders with two overhead cam-shafts and four valves per cylinder, were fitted with tyres, the makers of which had evidently during the War had no opportunity to gain experience in constructing covers for racing work.

So far as the British team was concerned, the race was a long tale of tyre trouble. Boillot changed seven wheels, Guinness nine, and myself fourteen. Anyone who has ever had occasion, when hurrying to a destination, to change a wheel through a burst tyre or puncture, will understand something of the effort it meant under racing conditions to repeat this job fourteen times. I am never likely to forget it. The race was won by Jimmy Murphy on an American Duesenburg car, and three of our team finished, Boillot taking fifth place, Guinness sixth, and myself seventh.

Tyres were by no means my only trouble in this event. When following Murphy along one of the short pieces of straight, the latter's car picked up a big stone off the road and hurled it back like a bullet. It was as though the Duesenburg was a sentient being and had determined to put us out of the race. The stone struck my car with such force that it went clean through the wire-mesh stone guard which formed a sort of rudimentary wind-screen, through the moulded steel scoop which was intended to protect our eyes from the wind, struck the steering wheel, severing the cord wound round it and then hit my mechanic, Moriceau, on the head, knocking him practically unconscious and cutting his head badly.

Moriceau has, of course, since distinguished himself as a very fine racing driver, but in this race it was as a mechanic that he shone. Few better have ever lived. He had coolness, knowledge, a wonderful pair of hands, and a very quick imagination.

Another incident I recall proves how important attention to small details can be.

The petrol filters were fitted outside the chassis of our cars and had a small drain-cock screwed into the bottom of the filter itself, which projected outside the bodywork of the car.

On the seventeenth lap I saw Guinness' car by the side of the road, with the driver and mechanic among the trees frantically whittling away some wood in order to form an improvised bung to plug up the bottom of their filter where a stone from an overtaking car had carried away the tap.

This Grand Prix at Le Mans showed how valuable a good mechanic could be. Quite soon after the start one of the wheels of my car had picked up a stone and hurled it at the oil tank, which it fractured so badly that unless a repair could be effected it was evident that I must retire. Even Mr. Coatalen himself, a man who does not easily give up hope, said that to attempt such a repair was out of the question.

But Moriceau thought differently, and without delay proceeded to put his ideas into practice. He seized a large lump of cotton waste, pushed it into the hole in the oil tank and, taking a hammer, caulked the hole by beating in the sides of the tank on to the cotton waste. It was a remarkably effective piece of work, though risky. With the least little bit of bad luck, odds and ends of cotton-waste might easily have got into the oil-circulating system, stopped the lubrication to some essential component and resulted in a seizure of the engine. This, however, did not happen, nor did we lose any oil to speak of. By virtue of filling up occasionally we were able to finish the race.

Both Moriceau and I, however, had had quite enough of stones by the time we had crossed the finishing-line. Even this did not complete our list of troubles, for about half-way through the race the set-screw of the Delco ignition head slipped and it was necessary for Moriceau and myself to devote many valuable minutes, to say nothing of a lot of blistered skin, in re-timing the engine, a job which is certainly not most appropriately accomplished by the roadside.

But still, in spite of it all, I am inclined to think that if, during this first road race of mine, the engine had fallen into two pieces or one of the axles had cracked in the middle, I would somehow have succeeded in finishing the full distance. To get there meant more than anything else in the world to me at that time.

The next race in September 1921 was the Coupe des Voiturettes, which was run on the same course at Le Mans as the event described above. This was the first of the 1500 c.c. races, and Mr. Coatalen had entered three Talbots which had been built at Suresnes. They had 4-cylinder engines, which might be described as one-half of the straight-eight Sunbeam motors which had been driven in the Grand Prix. The drivers were Lee Guinness, Rene Thomas, and myself, with Moriceau, Divo, and Perkins as our respective mechanics. André Boillot, had he been fit, would undoubtedly have had the wheel of one of the Talbots in this event, in which case I should certainly have had to stand down. As it happened, the same stroke of ill-fortune that incapacitated him gave me my second chance.

Boillot had figured in a serious accident at the Spa Hill Climb in Belgium. Shortly before it was his turn to climb the hill the local agent for Talbot cars came to him and begged him to take as passenger a customer who was almost certain to buy a car. Much against his inclination Boillot agreed. The mechanic, Ledu, gave up his seat, and this saved his own life. The conditions were as bad as they could be. It was pouring with rain, and the road was of granite, with a corner which had been paved with asphalt.

Boillot, going at a very high speed, braked on approaching the corner of whose treacherous surface he was probably entirely in ignorance. The front wheels locked, the car skidded completely out of control and smashed into a tree. The passenger was killed on the spot, whilst Boillot damaged his face so badly that he has never quite looked the same.

If I had worried Mr. Coatalen and others to give me a chance, it was now their turn to worry me, and I am bound to confess that I have never in my life had quite such a miserable time as I had to go through when practising for this race.

It is all over and done with now, and I realise that it was probably good for me. But I was the youngest, newest, and certainly the most nervously keen member of the team, and I was treated in a way that showed me I was the least welcome. Until I started in the race I had never been given the opportunity of doing a single lap of the course on my own car. Instead, I was constantly employed upon making carburettor tests up and down the straight leg of the course and consequently wearing out my car before the race. I certainly did them as conscientiously as I could, but I was made to feel that I was little better than an automaton.

After coming back from a test of this kind and making my report on the various adjustments which had been made, Mr. Coatalen and his assistants would think nothing of turning to my mechanic and asking him point-blank if what I had said was accurate. In fact, during the days of practice, I was loaded with abuse from almost morning till night.

All this may have been part of the training devised to ascertain whether I was likely or not to become a reasonably good driver, but it was extremely unpleasant and disheartening. To be frank, I certainly did deserve some of the abuse received, for I was guilty of a mistake in driving that might have put my car out of the race long before the starting-flag dropped.

In practice one morning, when I was approaching the end of the straight leg, and doing a very respectable speed, after going over the top of a slight rise, I saw in front of me a large farm cart loaded with logs. It was touch and go whether the car could be pulled up in time, but by treading on everything within reach, an accident was avoided. The result was a catastrophe, as indeed it must nearly always be when a clutch on a racing car is withdrawn at high engine speed. The clutch-withdrawal mechanism is unlubricated, and even the clutch itself is never used for changing once the car is under way. I did not know this, and, as a result, the withdrawal mechanism was badly seized.

There was nothing for it but to take the whole of the clutch down, in the hope that a new clutch might be reassembled in time for the race next morning. Moriceau and I worked most of the night on the job, and the car was ready just one hour before the starting-flag fell.

I mention this to show that the path of the racing motorist is not always strewn with roses.

The conditions for the Coupe des Voiturettes were admirable. It was a beautiful warm day, and the authorities who were responsible for the upkeep of the circuit had learnt a lot since the Grand Prix three months before. Twenty-three cars took part in this 300-mile race, but the corners were scarcely torn up at all. This, of course, was largely due to the fact that they were much lighter cars, although they were nearly as fast.

The race, although of importance, was utterly devoid of interest or incident as far as the Talbot team were concerned. We all drove to order, my instructions being to follow Guinness and not to pass him unless his car should meet with some mishap. Our cars finished first, second, and third, Guinness being about a minute behind Thomas, whilst I took third place thirty seconds behind Bill. The cars ran non-stop with the exception of Thomas's. On this the cover of the universal joint became loosened, and it was thought best to tear it completely off rather than attempt to repair it.

This was the second time in motor-racing history in which one make of light car had finished first, second, and third, the first occasion having been in the Coupe de l'Auto at Dieppe in 1913, when the Sunbeams also finished in this order.

In October 1921 the Junior Car Club, an organization to which the modern generation of motorists owes a heavy debt of gratitude, held its first two-hundred miles race at Brooklands. This took place in October, and was so eminently successful, and created such great public interest, that it was obviously to be the first of a long series. It was certainly the most important long-distance event run in England since the War. The team chosen were Malcolm Campbell, Guinness, and myself;

Thomas, whose place would otherwise have been assured, having declared that he was not keen on the event.

Except that Lombard on a Salmson ran into the pits near the fork, and did a certain amount of damage, there was not a great deal of excitement in this race.

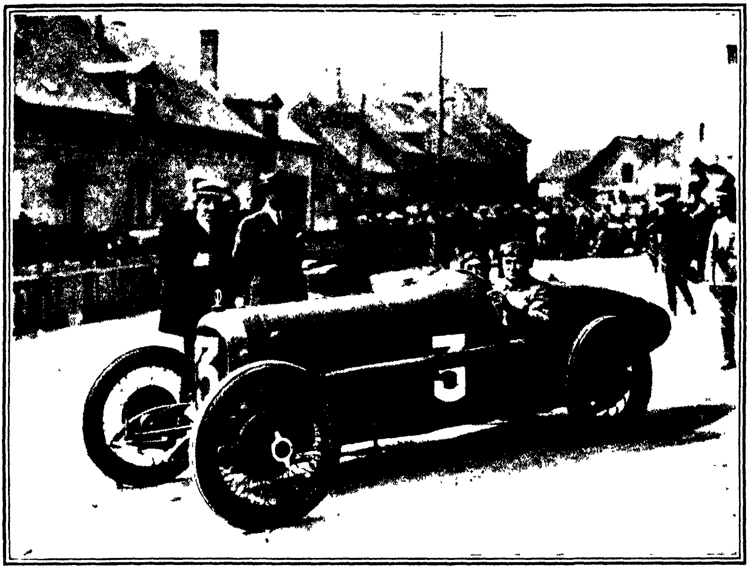
A considerable field participated, some forty cars facing the starter. The start was an impressive one, the cars being arranged in lines of fourteen or sixteen abreast,

Towards the end, however, most of these had been weeded out by one sort of failure or another. The Talbot-Darracq team reproduced its Coupe des Voiturettes form by again finishing first, second, and third, the order being myself, Guinness, and Campbell. Guinness ran non-stop, but Campbell lost a tyre about half-way through the race, whilst I, in the last lap but one, punctured a rear one. I knew from the lap-scoring boards that I had no earthly chance of changing it, and so ran on, finishing on the flat cover just three seconds ahead of Guinness. The average speed of the race was 88·2 m.p.h.

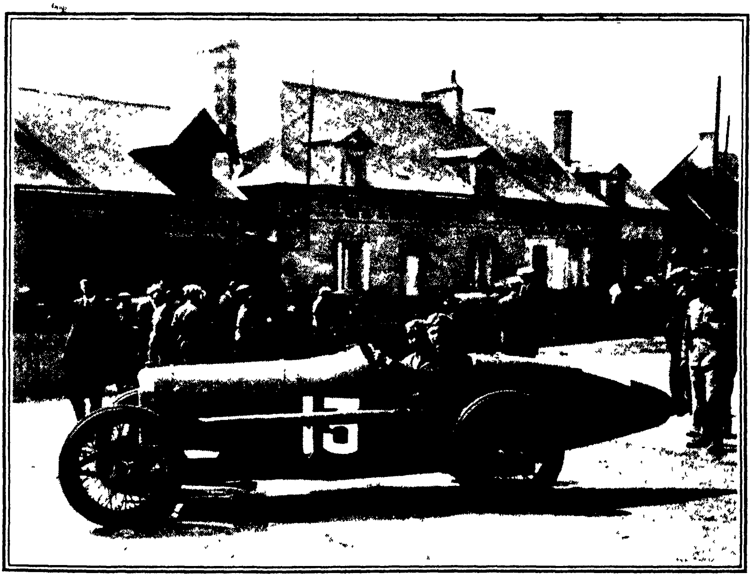
Thus ended my first year's racing. It had been forcibly brought home to me that professional racing, as practised in Europe, is far removed from the popular idea.

I realised just how little I knew either about the design of cars or the driving of them, and, in fact,

TYPES OF CARS IN THE 1923 GRAND PRIX



GUYOT, ROLAND PILAIN



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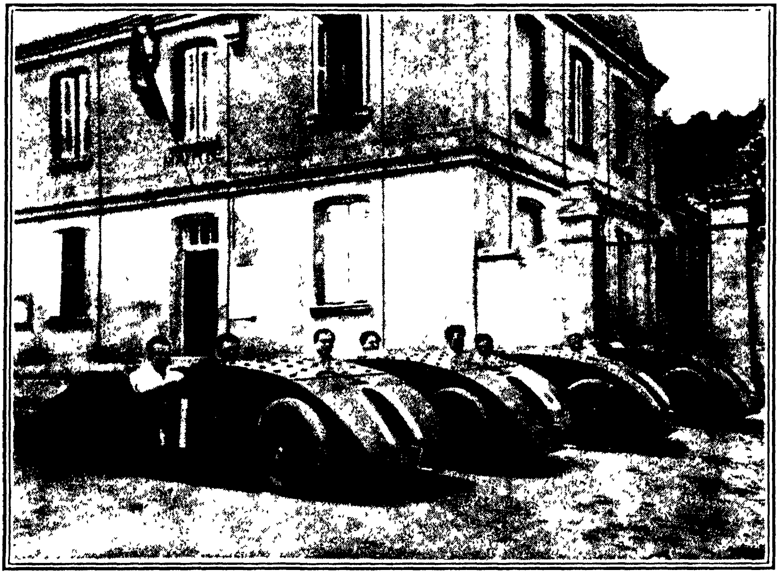
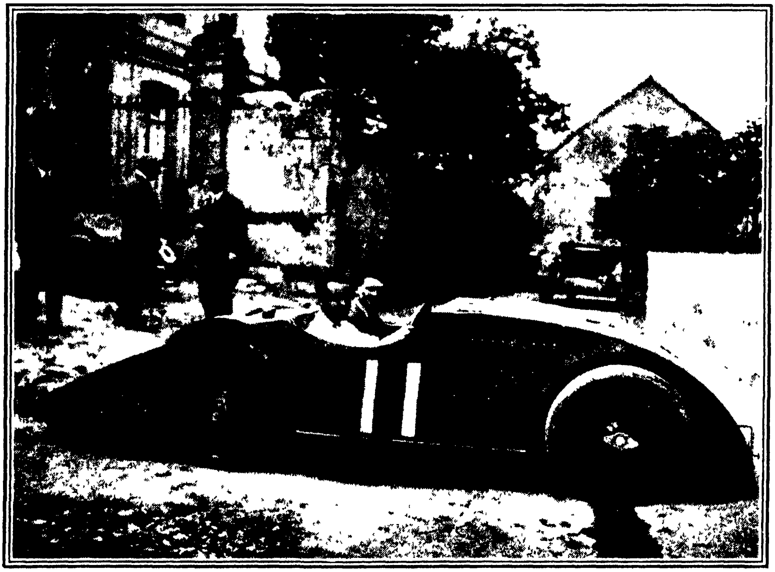
TYPES OF CARS IN THE 1923 GRAND PRIX



THE BUGATTI TEAM



E DE VISCAYA. BUGATTI

the same may be said even to-day, because the more one knows of any subject, the less one realises one really knows. Although ninety-nine people out of every hundred can be said to be capable of driving their car to its destination with a certain amount of certitude, there is not one person in every thousand drivers to-day who really knows how to " drive," or can even be said to approach remotely the skill necessary before becoming a successful road-racing professional.

Professional drivers will tell you that the rarest man in the world is the one who can drive by instinct. Yet the pilot of a racing car in a road race must be an instinctive driver. There are periods when a man's whole body goes numb, when his hands and feet absolutely refuse to obey his brain. There are the lapses lasting for seconds, when each second means sixty yards of distance covered. It is then that the driver's instinct holds the car to its course until the danger is passed.

It is just this driving instinct which has made all the well-known drivers in the past. Mechanical knowledge is not a vital asset, but the driver and his car must form one unit working in perfect harmony, one with the other, and to accomplish this he must instinctively know or feel his engine. Many professionals are purely mechanical drivers. By that I mean that they know that by pushing the gear-lever in a certain direction, with a certain amount of force, another speed, with luck, is obtained; but this type of driver, even though he may win a few races, provided the firm for whom he is driving gives him a strong enough car, will never be successful if he is asked to get the best out of his car, or if he has to nurse it to get the best out of it.

I have driven with a great many people in my life and it is my honest opinion that not two men in every hundred can really drive. They may be successful in getting from place to place, but that constitutes the sum-total of their capabilities. You are bound to meet large quantities of indifferent drivers nowadays, on account of the number of cheap cars being placed on the market, which come within reach of people with no pretence of mechanical knowledge or experience.

Naturally, however, driving in a race and driving an ordinary touring car are far apart. In the first case, the driver's sole aim and object is to keep his engine developing the maximum power of which it is capable, which can only be achieved by never letting the revolutions per minute drop below a certain point. Every layman knows that the faster an engine runs the more power it develops. In a racing engine the breaking strain is worked out beforehand. That is to say that the driver knows that at, say, 6500 revolutions per minute his engine has a life of 50 hours and develops 150 horse-power, but at a higher r.p.m. the lasting power of the engine is unreliable ; in other words, it may break some vital part at any minute.

The driver's object, then, is to keep his engine revolving at this speed all the time, irrespective of what road speed the car may be travelling at, in order that he may be making use of the maximum power of output.

This, of course, calls for constant and lightning changes of gear, both up and down, at road-speeds varying from 30 to 120 miles per hour. These changes can only be accomplished with any degree of certainty, by ear, and without the use of the clutch. As soon as a driver gets the " feel " of his engine he can do this without much difficulty. Any good driver should be capable of getting into and driving any car of any make, as well as a man who has driven that car for years, always provided that the car is in good condition and that there are no idiosyncrasies to be learnt on account of wear and tear.

A change of gear without the use of the clutch is always much quicker than one when the clutch is used, but naturally it requires a certain amount of practice before the driver can be reasonably sure of not making a complete miss, which will cost him valuable seconds.

There is also such a thing as being slow and dangerous as well as fast and dangerous, and of the two I prefer the fast and dangerous driver, because, provided he goes fast enough, he will scare the people out of the way. You can argue this out mathematically, if you like.

Take, for example, an ordinary main-cross roads, where two main roads intersect each other. Supposing you take the crossing at 60 miles an hour you are in the " zone of danger " (*q.e.*, the cross-traffic area) for something less than a second, whereas if you cross at 20 miles an hour you are in the dangerous area for three times as long, and consequently the risk of meeting cross-traffic is three times as great. Also, should you see that a car is approaching the cross-roads from either side, there are only two courses open to you, to accelerate out of harm's way or stop, and whichever you do necessitates the other driver doing the opposite to avoid you. If you stop, you stop in the centre of the roadway, if you accelerate without changing gear, your " get-away " is bad because the engine is turning too slowly to develop enough power to be of use to you.

On the other hand, if you cross at high speed under the same circumstances, the approaching driver will either put on his brakes when he realises the speed at which you are travelling because you will terrify him, or else you will have crossed before the necessity for this even arises.

I fully realise that this may give rise to criticism, and that such a manœuvre is only to be undertaken by people with experience, but I merely mention it to illustrate that slow and fast driving can be equally dangerous.

Now to revert to the two different types of driving which are experienced in racing. The first is driving on the track, such as Brooklands or Montlhery, near Paris, or the American tracks; the second is road racing. The difference between the two is vast, and different types of drivers are needed for them.

Driving on the track is merely a question of what speed the car is capable of attaining, and most people with relatively little experience can become successful track drivers, provided they get hold of a fast and reliable car.

On the road, however, it is very different, because there the individuality of the driver plays a far greater part. Above everything, judgment is the predominant factor, and however good a driver may be on the road, unless he has judgment his days will end in disaster. In a modern road race every portion of the car is tested practically to destruction, and unless the driver can change speed instinctively and without crashing his gears, he will eventually break up his car. The reason for this is that modern racing cars are built as near the breaking-point as possible, in order that the construction should be light, and this in turn necessitates having very light working parts, which naturally will not stand rough handling.

Of course, the main difference between track and road racing is the fact that in road racing there are corners to be negotiated, whereas on the track there are none. Broadly speaking, there are two ways of going round a corner fast, the first being to approach the bend on top gear, and allow the car to roll round before changing gear and accelerating on straightening up, and the second is to change down on a pre-determined point before the corner, and go round " on the engine." As far as the time factor is concerned, there is very little difference between the two methods, as has been frequently proved by cornering against a stop-watch, but after having made very careful comparisons in both cases, I am sure that the second method is greatly to be preferred from many points of view. Perhaps it would be easier to explain matters by means of the following illustration.

The driver approaches the bend at top gear, say, at a 100 miles per hour, he decelerates some 60 yards before the apex of the corner and changes down into the gear on which he proposes to negotiate it. By this method of changing down before the bend itself he saves the braking powers of the car by using the over-run of his engine as a brake itself. The bend is negotiated in the gear which will give him the maximum amount of acceleration upon leaving it.

From the point of view of safety and controllability there is no question that this method is by far the most satisfactory. For instance, when the corner is negotiated in top gear, if, by any chance, the driver shows a lack of judgment and overshoots his corner or approaches it too fast, he has not got the power of the engine to help extricate the car from its difficulties. It has been proved through years of driving on the road that the one and only way to extricate a car from difficulties is to use the power of the engine in an emergency, consequently, if you are on top gear at the time, the engine will be turning too slowly to develop its full power, and will be incapable of skidding the back wheels.

It is quite useless to depend upon " steering " the car out of trouble in cases like this, because the adhesion of the front wheels is not sufficient at high speeds to permit of the direction of the car being rapidly changed. Other advantages of this method of cornering are that wear of the brakes is to a large extent avoided, which is important in a long-distance race. Also by allowing the car to overrun the engine on the approach of the bend, a better cooling effect is obtained.

Naturally there is a prevalent tendency to take the shortest course on a bend, but considering the thing geometrically, the driver should always follow the widest and most gradual curve possible. Close cornering of bends is certainly spectacular, but races may easily be lost by striving too much after " effect." A driver should understand something of the stresses of his car and engine and use his judgment in avoiding any undue stresses, which not only jeopardise his chances by mechanical failures, but also slow the car down unnecessarily. After long experience in fast driving, one becomes accustomed to taking corners at the right speed, on all occasions, but, like everything else, practice makes perfect where this phase of racing is concerned.

If a driver has had no actual experience of cornering at speed he should study the character of the curves well before the event in which he intends to take part. So much depends upon knowing just what your car will do, and it is unsafe to take any risks by going in a race unprepared for eventualities.

It is not enough to be able to negotiate a corner successfully when one has the road quite clear, for in the race you may find someone in front of you who misjudges his corner, and you must allow for events of this nature.

The most important point to discover is the exact distance in which the car can be stopped by a normal application of the brake, thus leaving a little in hand for emergencies.

At each curve of a given circuit about three landmarks, such as trees or telegraph posts, should be selected. The first of these should mark the point on which the brakes should be applied if one has plenty of time in hand. The next should mark the point for braking if it becomes necessary to do an extra fast lap, and the third should mark the emergency braking spot, and under no circumstances should the brakes be applied after this point, for any panic braking would mean disaster.

Tyres, of course, play an all-important part in cornering, and for road racing it is desirable to select a tyre with a tread presenting a good area to the road surface. For track work a tread of curved section is best, with fairly shallow and closely-spaced ribs. If tyres with projecting centre ribs are used for road races, there is a danger of lateral float, due to the resiliency of the centre rib in a lateral direction, and, small though this may seem, such an action may easily make all the difference between keeping a straight course at high speed and going into a ditch on either side of the road. High-pressure balloon tyres are ideal for fast cornering, on account of the large surface presented to the road.

While on the subject of tyres, a phenomenon which is ever constant in racing, and which never occurs under ordinary touring conditions, is that of tread flinging; this means to say that the tread of the tyre, or that portion which is in constant contact with the road surface, is frequently flung, should the cord of the tyre become so hot as to melt the vulcanizing compound which glues the rubber tread to the cord itself. As a result of this, racing calls for a specially designed and built tyre.

Tyre troubles are responsible for 50 per cent of failures in racing, and it is not too much to say that the speed of nearly every racing car is entirely limited by the tyres with which it is shod.

CHAPTER VII

1922

The last Tourist Trophy race—Driving in rain and mist—The Strasbourg Grand Prix burned as I drove—Biagio Nazzarro's death—Chassagne's marvellous escape at Brooklands—Marooned on a Sicilian mountain—The bill that was paid with a cloak-room ticket—A race of tragedies.

THE following year, 1922, the first and the last post-war Tourist Trophy race for cars was run in the Isle of Man. One says " the last " with great regret, for this Manx course is far and away the most interesting of any in Europe, and in point of severity comes next to that of the Targa Florio in Sicily. It is a race which surely ought to be revived, but I suppose that there are now so few firms really interested in racing, that further organisation of the T.T. races is out of the question. Apart from that, there is the objection that the Isle of Man is such a long way from London, and indeed from England, that a really big crowd cannot be attracted.

Although I myself only took part in this one Tourist Trophy, I saw enough of the organisation to appreciate the splendid work which is done by the Royal Automobile Club, in the preparation and control of this event. It is a pattern to all other motor-racing bodies, for the regulations are not only clear, but they are interpreted with scrupulous fairness, and the whole conduct of the race is characterised by foresight and sound knowledge of what will conduce to the safety of the participants and the interest of the spectators.

There was not a large field for the 1922 Tourist Trophy, which really consisted of two races run concurrently, namely, one for 3-litre and one for 1½-litre cars. In the former category there were only the three British makes—Vauxhall, Bentley, and Sunbeam. These latter cars were straight-eights, exactly the same as those which had been run in the 1921 Grand Prix, whilst our rivals were equipped with four-cylinder engines.

The Sunbeam team consisted of Lee Guinness, Chassagne, and myself, and there is no doubt that we had the fastest cars in the race. In practice I managed to do three laps of the 37-mile course, part of which rose up Snaefell Mountain and down the other side, in under thirty-five minutes, which I believe is the fastest time that has ever been done by a car in the Isle of Man. During our stay in the island the weather had been admirable, and practice in the early morning had been enjoyable. But on the morning of the race the sky was leaden, and an hour or so before the start the rain descended in a steady downpour. In all my racing experience I have never known worse conditions.

Naturally the cars were not fitted with proper mudguards, and the tarred roads were like shallow rivers of water, which the tyres flung in all directions, particularly over the drivers. There was, too, a heavy mist on the mountain, which did not make one any happier in tackling this part of the course.

A rather unfortunate incident occurred to our team before the start of the race. Guinness' car, which had been locked away perfectly all right the night before and should have only had to be pushed out of the garage and warmed up, developed clutch trouble, the result of which was that the clutch could not be freed to allow the driver to engage speed.

Everything was tried, every known remedy was used, to try and get the clutch out, but without success, till at last it was too late to get the car to the starting-line, as the circuit was officially closed by the police, and Guinness had to scratch.

This merely goes to show the contrariness of racing cars, especially as this particular car was started up and the clutch satisfactorily freed within about an hour of the race starting.

Starting No. 4 I passed two cars in the first lap, averaging for the circuit a speed of 60 odd m.p.h. All appeared to be going well. It was abundantly evident that the Sunbeam had the legs of the Bentleys and Vauxhalls. For many laps Chassagne and I had the lead, with the former eight minutes behind me, and although I and my mechanic, Dutoit, well knew that we had to prepare for all sorts of eventualities, the car was running so beautifully (and by this time the appalling rain had ceased and the conditions were better) that we were feeling fairly secure of the result. Indeed, the lead which we had managed to establish was such that thenceforward we could take matters fairly easily.

Unhappily, all these calculations were hopelessly upset. Within 300 yards of the summit of the mountain road the contact breaker of the magneto came adrift, and the car came to a standstill. There were two elements of bad luck about this breakdown. In the first place, we were only 300 yards short of a point from which the car might have coasted right down to the pits, and a new contact breaker fitted. In the second place, our own spare contact breaker had been lost. We searched the road for some distance back as thoroughly as we could, to try and see if we could find the one which had come off the car, but it was like looking for a needle in a bundle of hay, and at last we were forced to give up. Anyhow, this little incident cost us the race, which was eventually won by Chassagne, who had a no-trouble run.

Just prior to the race there occurred between

Guinness and myself one of those incidents so common to racing when one's nerves are on edge, and which, though they appear serious enough at the time, one laughs at afterwards. But the conditions under which racing practice is carried out often lead to unwarrantable suspicions, and deplorable shortness of temper. As is usually the case before a race, we had to make a lot of experiment with carburettors. Every morning, jet after jet, choke tube after choke tube had been tried, in the hope of getting a few extra r.p.m. on the flat or up the mountain. One day I found to my great joy that I had got a setting which gave better results than we had ever had before.

I had got my own car running perfectly and started to take the trouble to insert the same jet combination into Guinness's car. On that morning Bill, I fancy, had been feeling the odd spot of liver ; anyway, when he came up to the garage where our cars were kept, he found me busily engaged upon his carburettors. Without pausing to think, he immediately concluded I was tampering with his car. Then the storm broke loose ! He was livid. I was boiling inwardly at the mere idea of being thought capable of such a thing as he imagined. But the thing had gone much too far for any immediate reconciliation, and I believe it was quite ten days before we spoke to one another.

" Bill," apart from this lapse, has always been one of my closest and most intimate friends and we are now able to laugh over it. People are inclined to think that motor racing is a mechanical pursuit, offering little or no scope for human nature. On the contrary, as a school of temper control, it cannot be beaten or even approached by any other sport that I know of.

Another feature of this race occurred at the pits, where my mechanic, Paul Dutoit, one of the strongest men I have ever seen, put twenty-eight gallons of petrol into my car, and changed a wheel in thirty-two seconds dead! I think that for a combined wheel change and " fill up " this record remains unbeaten to-day.

You must realise, too, that this time is taken from when the car rolls up to its marked square in front of its pit, to when it leaves this area the other side after its replenishment is completed. In other words, one must include in the thirty-two seconds the time taken by both driver and mechanic to dismount, on entering the pit area, to get on board again after their work is finished, and to start the engine, which, according to rules, must be stopped while the car is stationary in front of its pit.

There is no time for even one wasted gesture or movement. Everything must be thought out scientifically beforehand, then tried out in practice against the stop-watch till one is action-perfect.

The majority of big races are either won or lost at the pits, and the importance of efficient pit work cannot be too highly placed.

You can easily lose 30 seconds at the pits by clumsy and " unthought out " work, yet to gain 30 seconds on a rival in a 500-miles race will take 15 laps of a 10-mile circuit if you are lucky enough to make up even 2 seconds a lap. And all the time you are driving to the absolute limit while he, though he is only 2 seconds slower than you over a 10-miles lap, can afford to make certain of every corner and take them with a margin of safety which you cannot. Consequently the risk of your having an accident is correspondingly greater.

I realised the vital importance of pit work almost as soon as I started to race, and consequently made an exact study of it. Often Dutoit and I used to spend hours and hours by ourselves on the road working to save one useless movement, and so gain a fifth of a second here and there.

The results completely justified our endeavours, and Dutoit and I succeeded in creating the record time for pit operations in most races in which we drove.

The Grand Prix of 1922 was run over the Strasbourg circuit. This is a triangular course of 8·3 miles, and it had to be covered 60 times for a total distance of 500 miles. This race at the time was described as one of the most thrilling that has ever been held, and from the spectator's point of view it may have been. From my own viewpoint, and from that of my fellow-members of the Sunbeam team, K. Lee Guinness and Jean Chassagne, it was not a particularly brilliant affair, for our cars were put completely out of the running by a common trouble.

This was the first year that a limit of two litres in capacity was imposed upon participants. The Sunbeams, which had been designed by Mons. Henri, late of the Peugeot Company, under the supervision of Mr. Coatalen, had four-cylinder engines, and were, as we thought, the last word in racing-car construction. They had given eminently satisfactory results in practice and on the test-bench, but in the race itself they came, each and every one, to a sad end, through the breakage of inlet valves. First Chassagne's motor broke down from this cause, then Guinness, and finally my own.

So far as speed was concerned, the Fiats were easily the fastest of all the eighteen starters, and I think the Sunbeams were next in point of pace. Other runners were three Ballots, three Roland-Pilain's, four Bugattis, and two Aston-Martins. All these cars were new, as previously the Grand Prix regulations had called for engines of 3-litre capacity. A point of interest in the event was that 4-cylinder, 6-cylinder, and 8-cylinder engines were represented. The Roland-Pilains and Bugattis were eights, the Sunbeams, Ballots, and Aston-Martins fours, and the Fiats sixes.

One of the most humorous incidents of my racing career occurred prior to this Grand Prix. Lee Guinness and I were on our way to race at Strasbourg. I was three or four miles ahead of him on the road, both of us doing about 100 m.p.h. Right ahead lay a clear, straight stretch, on which I opened out and let the car really go.

At the end of the straight I swung round a corner and was amazed to see a long, straggling village sprawling ahead of me. It had been hidden by the hedges, and I was into it before I knew where I was.

I wondered what on earth to do. By the time I had finished wondering I was through the village, still at 100 m.p.h., out at the other end, and over the brow of the hill.

All I saw as I flashed through was a kaleidoscope of houses and fleeing people and a blur of blue as the local gendarmerie poured screeching and yelling out of the " poste."

Over the hill I stopped, got out, and stalked cautiously back by the hedgeside to the village to see what would happen to Bill.

Half the population was gathered gesticulating in the street, screaming as only Frenchmen can, and wondering what sort of a thunderbolt it was that had disturbed their rural peace.

Suddenly the roar of Guinness' open exhaust smote on their ears.

Quick as thought the street emptied, the gendarmerie poured into the "poste," the peasants rushed to the inn and to their houses—and the next moment every house seemed to erupt men with bicycles!

These they proceeded to lay across the road—a long line of eighteen or twenty bicycles. Then they all scuttled back to cover like rabbits. The street was deserted, silent.

A second later Bill shot round the corner, saw the bicycles, trod on every conceivable thing in the car, and pulled up with locked wheels about a yard from the barricade.

Immediately every house poured forth gendarmes, poilus, peasants, mayors—there seemed to be lots of mayors—whilst the fiercest of the lot invited Guinness in thunderous tones to "come and be arrested." Meanwhile the rest excitedly piled all the bicycles against his bonnet. It was exactly like a scene from a comic opera.

Guinness did the only thing possible. He pretended to understand no French, stared owlishly at the gesticulating *maire*, and solemnly produced a map, which he unfolded.

"Où est la route à Strasbourg?" he inquired in an atrocious accent. His unruffled calm was too much for the *maire* and the gendarmes. They seized on this new issue, and all shouted together. There were three roads to Strasbourg at that point, as Guinness well knew, and the crowd divided into three camps on the subject. One yelled directions for one way and the other two for the alternative routes. Lee Guinness had judged Gallic psychology very well.

Suddenly as they were all gesticulating anew he backed the car, the bicycles fell down, the crowd sprang back, and Bill shot round to one side of the " Barricade " and was out of the village like a flash.

On the morning of the race we found the approaches to the racing track packed with cars and people. We turned down a side street to avoid them, and were at once stopped by a gendarme, who refused to let us pass.

It was useless to tell him that we were actually entered for the race. He refused to believe it. Every little car in the city had a number painted on it, and an open exhaust, and half the drivers seemed to have told the police that they were competitors.

Our gendarme was no more inclined to believe us than any of the others. It looked as though we should miss the race.

In the midst of it all, as we were still arguing, there arrived a mounted policeman, who backed his horse into the crowd and demanded to know what the fuss was about.

I was about to explain it all over again when Lee Guinness had an inspiration. He opened his exhaust, which let out a roar, the horse went up on his hind legs, the police rushed to pull him down on all fours again, the crowd opened out, and we got away.

It was rather a risky thing to do, and I fully expected a bullet in the back, for the French gendarme does not hesitate to fire at you if he gets a little excited.

Felice Nazzaro eventually won at an average speed of 76 m.p.h., covering the 500 miles in 6 hours, 17 minutes, 17 seconds. Almost up to the very end the team of Fiats were lying one, two, three. But disaster overtook them in the last few laps. Biaggio Nazzaro, nephew of Felice, broke either his front or back axle, ran off the road, overturned, and was killed almost instantly. Bordino, who had put up the record lap, also broke his back axle but did no damage, as he had the luck to break it on a bend when his speed was only forty-five or so, whereas Nazzaro's went when he was doing about 106 on the straight.

The only other cars to finish besides the winner, Felice Nazzaro, were the three Bugattis, driven by de Vizcaya, Mones Maury, and Marco. These, however, were really only modified touring cars, and it was more from courtesy than anything else that they were allowed to finish at all, the second man, Vizcaya finishing nearly an hour behind Nazzaro. This race was the debut of the straight-eight Bugattis, which have, since proving successful at their first attempt, taken such a large part in subsequent racing.

The conditions of this Grand Prix were not all that one could wish. The roads were covered with greasy mud from a heavy rain-storm the previous night, and the start was not too well conducted. All the cars had to trundle along at a very modest speed behind an official motor-cyclist, who, without much sign of warning, suddenly disappeared down a side bend. It was then a case of " put your foot down and go as hard as you can," so as to get on to the clear road, and as far as possible avoid the showers of mud which were being thrown upon one by the wheels of any cars that chanced to get in front. Starting with the number 21 I managed to come past the Grand Stand sixth in the first lap, having passed 15 cars in 8 miles.

It is curious how different practice is from the real event. At Strasbourg, Guinness, Chassagne and myself put in any amount of time on the course, and when we started we were all equally confident that we had a good chance of putting up a good performance. It never occurred to any of us that we were going to be put out of action by inlet valve breakages, and I think that if, before setting out, anyone had asked me to lay the odds against all the team failing from the same cause, we would have been ready to quote very extravagant ones.

During the practice phase I had been the subject of a good deal of leg-pulling. The one thing which, above all others, really worrys and annoys me, is a dirty motor-car, and I was not at all satisfied with the appearance of the Sunbeam. It was not only painted indifferently—to say nothing of the scratches and bruises that its surface had suffered under the usual preliminary stresses of tuning up—but it was full of oil leaks, and generally filthy. Accordingly, since I could get satisfaction by no other means, I unshipped the entire body and had it transported by lorry across the frontier to Kehl in Germany, where, at a carriage works, they made a very good job of it, which I paid for myself. I do not think the car ran any better or lasted any longer because it was nicely finished, but, and here is a curious phenomenon which, I suppose, is common in almost every form of competitive sport, *it soothed one's nerves.*

Perhaps this sounds foolish, but few people know how important a part nerves play. In motor racing, unless your driver is free to concentrate his whole brain energy on the driving of his car, he will not drive so far nor so well as the man who sits comfortably to his work, who does not have to grope for his change-speed levers, who does not have to depress his clutch pedal as though he were treading barefoot on a plank studded with pins, who does not have to tie his neck in a knot to see his dashboard instruments.

My own reaction to a clean well-painted car has always been, " Well, if it doesn't go, it *looks* good anyhow."

And, in nine cases out of ten, if a thing *looks* good it *is* good.

However, our cleanliness was not destined to last long. Indeed, in the whole of my racing experience I can recall only one other event which, for sheer misery behind the wheel, compared with this 1922 Grand Prix. After we had done a good number of laps and were running fifth, we pulled up to replenish the fuel tank. Naturally we did not intend to lose any time about it, as up to that time the car had been running quite normally, and on the supposition that it would continue to do so, and that the leaders might have their share of trouble, there was every reason to suppose that we should finish fairly high up, even though our speed was inferior. Most of the cars had had trouble of one kind and another, and there were not many runners left.

Just then a most unfortunate thing happened. Moriceau bungled the filling and petrol was splashed over the seats, leaving a pool in the middle of my cushion. We could not afford the time to attend to trifles of that kind, and instead of swabbing it up I jumped in, and relied on my clothes to absorb it almost immediately. I was in agony in a few minutes. Luckily, owing to valve trouble, the car broke down at approximately half the full distance of the race, but I know that even if there had been no mechanical failure I could never have finished. Had I gone another two laps I would have fainted from petrol burns which are one of the most painful types of burn known. I spent the next three weeks in bandages.

This race, among other things, accentuated the importance of special design in racing cars so that one can get at any vital part, or replace any component quickly.

This was emphasised in the case of the ill-fated Biaggio Nazzaro. Right towards the end of the race, and only a lap or so before, running third, he was killed, young Nazzaro had trouble with his petrol tank. Pulling up at the pits he detached the defective tank and fitted a completely new one in its place in less than fifteen minutes. One can imagine the time that this would take on an ordinary touring car.

The failure of the two Fiats let the Bugattis in to finish second and third, Vizcaya averaging 69·2 m.p.h. and Marco 63·8 m.p.h. The record lap, which was done towards the end by Pietro Bordino, was at an average speed of approximately 87¾ m.p.h., a very fine performance.

In one respect our own cars were unique, apart from them all failing from the same trouble. They were the only ones boasting any preparation against bad weather for the race, for we had small triplex screens fitted on the scuttles and a rudimentary kind of mud-guard over the right-hand side front wheel.

There were some amusing incidents in the race as well as tragic ones. Various dignitaries connected with the organisation of the race, and others representing the Government, turned up to the start a quarter of an hour late in Italian and American cars, and received a distinctly sarcastic ovation from one of the biggest crowds that has ever assembled to see car racing in Europe.

The speed of this race is worthy of attention, inasmuch as it showed that a properly designed 2-litre car could put up a faster performance than anything previously done by an engine half as big again. The circuit was triangular, and therefore put a premium upon rapid acceleration. Undoubtedly one of the reasons for the excellent showing made by the Fiats was their light weight. They weighed little more than 1450 lbs., the Sunbeams being about 100 lbs. heavier.

In August of 1922 the second 200-mile race was run, and it produced a thoroughly representative field. As before, there were two categories, 1100 c.c. and 1500 c.c. In the latter our team consisted of three Talbot-Darracqs, driven by Lee Guinness, Chassagne, and myself. These cars were precisely the same as had been used in the previous races, except that they had been fitted with better streamline bodies. Our principal rivals were the Bugattis, which were reported to be extremely fast. But, as it turned out, there was a dark horse of whom little had been heard before the race.

The result was that Lee Guinness won at 88·06 m.p.h. and George C. Stead, motoring correspondent of the *Sunday Times*, a very efficient driver and charming man, took second place at 86·35, whilst my speed was 85·55. I thought that I had quite a reasonable chance of winning again, as I was leading at the end of the first 100 miles by one and half minutes, and up till then had been averaging 92. Bill Guinness was running second. The newly designed Aston-Martins, of which much had been expected, were not redeeming their promise, and two of them quickly dropped out of the race. Quite early—in fact, in the sixth lap—Lee Guinness lost one of his near-side tyres, but after a quick change got away again and had no further trouble. Chassagne was not so fortunate. From the start his engine began to run erratically and was missing badly. He drew into the pits and changed his plugs, but this did not seem to improve matters much, nor, as turned out eventually, was it likely to, since the bad running of his engine was due to a slight failure of lubrication in the overhead valve gear which caused one of the rockers to stick. However, he was advised to go on in the hope that the rocker would free itself, and, as it happened, the fault rectified itself within a few laps.

Naturally we had been hoping that our Talbot-Darracq team would finish one, two, three, but this hope was soon blasted, as Chassagne lost so much time that, barring a miracle, he could hardly hope to get up to third place. As for myself, at three-quarters distance I was still leading, but I realised that my engine was not pulling up to its best form. I suspected plugs and pulled up to replace them, but the fault was not so easily cured. It was due to a burnt-out valve seat. For this no cure was possible and I had to finish the race on three cylinders only. But for this I think we might have won, as we had managed to establish quite a reasonable lead.

Chassagne was nearly killed as he was completing his forty-third lap. An outside back tyre deflated on the banking at the far end of the railway straight. The car instantly became completely out of control, did a violent skid and shot over the top of the track, upside down, crashing into a clump of bushes about 15 feet lower down. Neither Chassagne, nor Dutoit, his mechanic, were hurt, but Dutoit went up in an aeroplane immediately after the race and looped the loop in order to get a new sensation and take his mind off his narrow escape!

A curious thing about most motor-racing accidents is that in nearly every case the driver's shoes are torn off by the steering wheel as he leaves the body of the car, if he is thrown clear, as Chassagne was.

In this instance, I was about a quarter of a mile from the accident when it happened and saw nothing, but when I passed the place where his car had gone over the banking, I could not understand why a pair of shoes were lying side by side on the middle of the banking. I remember puzzling out, as I was driving, how on earth in the middle of a race a pair of shoes had got there.

I say elsewhere in this book that tyre trouble should seldom cause an accident, and as this accident was caused by one, a word of explanation is necessary. Our cars were not fitted with differentials, but had straight-through axles, and consequently when a tyre left the rim one wheel was of smaller diameter than the other, making the car tend to turn in a circle.

Later on in 1922 I took part in the speed championships of Great Britain, which were decided at the meeting organised at Brooklands by the Essex Motor Club. At this meeting I managed to win the 2-litre championship and the 5-litre championship, both on Sunbeams, the larger being the car that ran two years before at Indianapolis. This was a 6-cylinder. It made the fastest time of the day over a distance of 5½ miles, namely 105·58 m.p.h. Guinness won the championship of the unlimited class on the 12-cylinder Sunbeam at a speed of 104·04 m.p.h., though as a matter of fact he did the fastest lap at over 116 m.p.h.

The final heat of the 5-litre car championship was one of the best races I have ever driven. I was opposed by Count Zborowsky on an 8-cylinder Ballot, and by H. W. Cook on a 3-litre Vauxhall, one of the cars which had run in the Tourist Trophy, but had since been tuned up to show a larger turn of speed than it had in the Isle of Man. I was lucky enough to get my hoped-for victory, but it was by a very narrow margin, for I cannot have won by more than the length of a bonnet.

The next race in which the team ran was the Coupe des Voiturettes or International Light Car race for 1½ litre cars, run on the Le Mans circuit on September 22nd. This race did not seem to appeal to the public very much, and, in point of fact, did not attract a large field of starters. Probably the performances which had been put up by the Talbot-Darracqs in previous races had had its effect, and there were not too many makers who were prepared to build cars to compete against them.

Our team consisted of Lee Guinness, Divo, and myself, and, without being uncomplimentary to the other cars, which ran against us, we had things pretty much our own way and finished one, two, three. When one comes to think of it, this was really remarkable, and I doubt if any finer tribute to car design has ever been paid. These Talbot-Darracqs were not new cars, for they had thousands and thousands of miles to their credit, yet they had never been beaten, and it was only by an accident that they had been prevented from obtaining the first three places in all the races in which they ran. Guinness' speed was 72·1 m.p.h., Divo's being roughly the same, as he finished only 5 seconds behind. As for me, although I did the fastest kilometre at an average speed of 152 kilometres per hour, every possible malady from which a car can suffer came our way. For example, 27 minutes were spent at the pits in changing the magneto and re-timing the engine and, as if that were not enough, I had two punctures.

Then a form of trouble to which I had previously been a stranger in racing, declared itself. For some extraordinary reason the petrol-pipe from the rear tank to the carburettor became clogged up. There was plenty of this piping and most of it was hidden away in highly inaccessible places, to prevent stones puncturing it, so that the location of the faulty section was not particularly easy. In the upshot I had to change the whole length of piping, which had to be joined up by short lengths of flexible rubber tubing.

Repairs are an exhausting business. One works feverishly, often possibly making mistakes, but at least making them as quickly as one can. One knows exactly what one wants, and how the job should be done, and one has to endeavour to do it under a bombardment of advice and

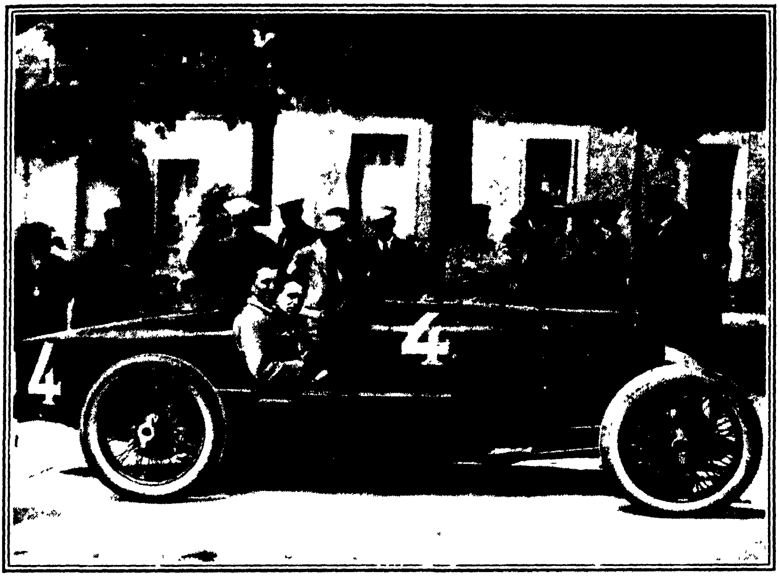


Photo *Temple Press*

ONE OF THE WORLD'S FASTEST ROAD-RACING DRIVERS, PIETRO BORDINO, ON A FIAT

Photo *Temple Press*

THE AUTHOR AND HIS MECHANIC, PAUL DUTOIT
Immediately after winning the Voiturette Grand Prix

THE 1924 GRAND PRIX

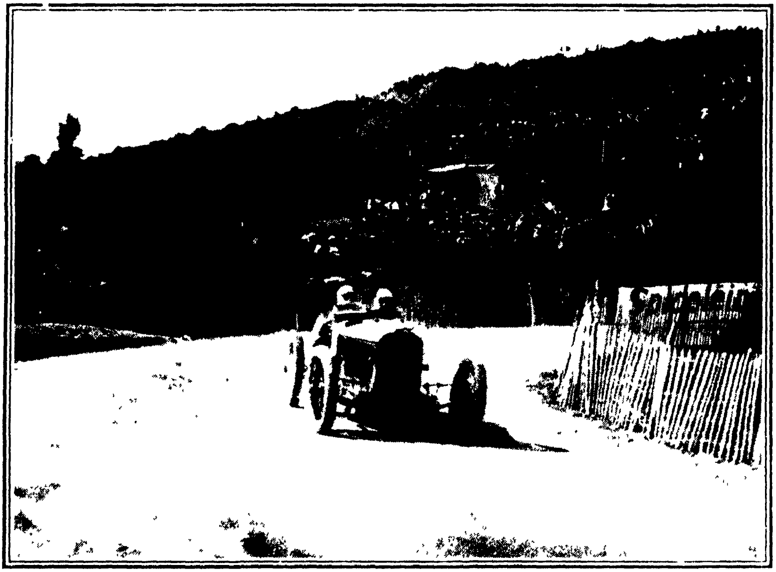


Photo "*Autocar*"

K. LEE GUINNESS, SUNBEAM, CORNERING

Photo "*Autocar*"

THE LATE COUNT L. ZBOROWSKI, MILLER, FOLLOWED BY THE AUTHOR contradictory instructions, yelled at one by all concerned.

Having brought one's efforts to a successful issue under this barrage, which is meant to be helpful but is very much otherwise, the next thing to do is to get the car started. Pity the poor mechanic! The driver gives a helping hand to get the car under way, and then leaps into his seat. Now it is the job of the mechanic to push, and on one occasion in this race Dutoit had to shove the car up hill for quite a distance before we could get the engine to fire.

Then, the mechanic must break all sprinting records for a yard or so to get in his seat, for the driver is wasting no time, and the moment the engine is running it is a case of " off at once."

The 1922 racing season was completed by the Penya Rhin meeting in Spain, and the Coppa Florio race in Sicily. Lee Guinness at this time had a yacht called *The Ocean Rover*, which had started life in good faith as a Castle type trawler, but had been converted with great skill and no little expense into a very fine yacht, having a thoroughly well-equipped garage forward for six cars below decks. The two Sunbeams for the Sicilian race were therefore put on board at Southampton, after which we proceeded to Havre to pick up the three small cars—Talbot-Darracqs—which were to run in Spain, and also the team of mechanics and pit gear.

To me yachting has always seemed to necessitate a particular form of highly developed intellect thoroughly to appreciate its delightfulness. The orthodox form of yachting à la French Riviera (what I call " harbour yachting "), when the boat is rigidly moored to the quay and cannot under any circumstances move more than a millimetre either way, thus allowing the owner to walk up and down his beautifully holystoned deck in spotless white flannels and " Palm Beach " shoes, does not appeal to Bill in the faintest degree. He despises it, and its advocates.

To him the only charm in yachting lies in the navigation of his own ship—the entering of ports without the help of a pilot, and, in fact, the complete controlling of the destiny of his vessel. Each of his passengers must take his turn at helping to run things, and perhaps there really is a certain amount to be said for this.

But personally I have never liked the sea. It does not agree with me.

Shortly after entering the Bay of Biscay it became very rough, and Bill, who was on the bridge, sent for me and told me that he heard a peculiar noise coming from the forehold as though one of the car's lashings had become loose and the thing might be sliding about. He suggested that I should go down to secure it. After a certain amount of bodily risk I succeeded in safely making the forward hatch and somehow negotiated the ladder leading to the hold.

There I discovered that underneath the bottom floor of the garage, where the cars were, the crew's food was stored in, on, or near the bilge, and one of the crates had broken its lashings, hit against the side of the ship and burst. Its contents, consisting of Yarmouth bloaters, were floating up and down in the bilge water. The smell baffled all powers of description! I made one wild dive for the nearest car, turned on the petrol, inhaled all the petrol fumes I could to remind me of land, fled upwards to the deck and the open air. After this I would not have cared if all the cars had broken loose and gone through the side of the ship. No earthly power would have forced me to go down that forward hatch again.

It is impossible for those who are good sailors to conceive the misery of those who are not, and this voyage will live in my memory as an experience never to be repeated.

We ran into another storm off some Cape or other (I was far too disinterested to even enquire the name) on the Portuguese coast, and after being flung out of my bunk on to the floor twice, I thought of going up into the deck-house where I could lie full length on one of the leather sofas and wedge myself in place with my feet. When I reached it I found one of the mechanics, Moriceau, occupying the other sofa for the same reason.

Not a word was spoken for about an hour. Then we shipped a green sea (nautical term for solid water) which caused the ship to give such a lurch that my sofa pulled out the bolts by which it was secured to the floor, and overturned on top of the wretched Moriceau, flinging us both on the floor which was awash with two inches of water. So great were the depths of misery to which we had sunk by this time that we remained lying on the floor in the water till morning.

To Bill, however, must go the credit of navigating *The Ocean Rover* to Gibraltar, Barcelona, Corsica, Palermo, Taormina, Lipari Islands, Stromboli, Capri, Castella Mare, Naples, and back to Monte Carlo, without mishap of any kind, and, except at Barcelona where it is obligatory, without the help of a pilot.

We duly arrived at Barcelona, and found that the Penya Rhin circuit was exceedingly good and that there was every prospect of a good race. It turned out to be, for me, most disappointing and not a little painful. Half-way through the race the car started to run badly, and very soon afterwards an inlet valve snapped and dropped into the cylinder. This cylinder promptly proceeded to suck itself full of "juice," so that the whole inlet pipe must have been choked with liquid. Not altogether to my surprise, the engine caught alight at the first corner, and both Moriceau and myself were greeted by a sheet of flame.

Moriceau quickly put his legs over the outside of the body and kept himself out of serious danger, but in a few moments my feet were unpleasantly hot. When I pulled up at the pits I got little sympathy from those who were managing our affairs. Mr. Coatalen, who evidently does not know what it is to act as a human firework, calmly recommended me to go on, and if I should have any further trouble with my shoes catching on fire, he advised me to get out and step in a puddle!

By dint of making adequate preparation for corners, I was enabled to keep the car going, although on only three cylinders, and ultimately finished fourth, suffering from badly burnt feet.

In due course we sailed for Palermo to take part in the Coppa Florio, the two 4½-litre 6-cylinder Sunbeams to be driven by Chassagne and myself. For us, at all events, this was a most extraordinary race, as neither of us had the least idea of the extremely hilly nature of the circuit. This measures 69 miles round, and the general opinion is that there are 1600 bends and corners to it. The altitude varies from sea-level to about 3500 feet. The difficulties are further complicated by the fact that some of the road surfaces over which one has to drive, are such as to bring the driver of an ordinary touring car down to an absolute crawl.

It is certainly difficult to imagine any race in which a car could be submitted to more searching conditions. In contradistinction to most of the races in which I had participated, the cars were not started simultaneously, but were sent off at five-minute intervals, and therefore one was apt to get rather confused as to what position one held while the race was in progress. The field was a mixed one. In addition to our two Sunbeams there were two Peugeots with 4-cylinder sleeve-valve engines, handled by André Boillot and Bequet, three Diattos driven by Meregalli, Maserati, and Arnone, and a couple of O.M's of 1500 c.c. driven by Minoia and Lopez, together with some other less interesting makes.

At first glance it might be supposed that the big cars would have a great advantage over the little ones, but the nature of the course is such that this advantage, though it exists at a few points, is completely eliminated at others.

To show how absurdly ignorant we were of the character of the Coppa Florio race, it is sufficient to say that we set out to take our first experimental run round the course at three o'clock in the afternoon on a late November day. I naturally thought that it would not take much more than an hour to get home again. I had no experience of Sicilian roads and conditions.

Before we had gone far, rain fell in torrents, and it became pitch-dark with remarkable suddenness. Headlamps, or even sidelamps, were not included in the car equipment, and I was reduced to crawling along with Moriceau walking in front in the middle of the road and I following the white blur of his overalls as best I could with the car. The only thing to do was to put up at the nearest village, but when we arrived there we found no rooms were to be had. There was some little difficulty in making ourselves understood, for neither Moriceau nor myself knew many words of Italian, and we were both utterly ignorant of the patois that passes for Italian in Sicily. Nothing we could do was apparently of any use in producing accommodation for the night.

Eventually, after much perseverance, we were led to a barn, wet and hungry, and told we could sleep on the hay. Next morning a difficult situation arose. I do not suppose that the bill for our night's lodging was particularly excessive, but we had no Italian money, nor, if I remember aright, had we any money at all!

Our host and a crowd of villagers who had collected to his support neither knew nor cared who we might be, and it was perfectly evident that we were not going to be allowed to get away without giving them satisfaction. It was a very awkward moment, as it might have been hours before any of our friends could find us and relieve the situation. But Moriceau solved the problem. Somewhere in the depths of his numerous pockets he found a P.L.M. cloak-room ticket. It looked a serious and important document, and Moriceau, without more ado, proceeded to explain to our host, by gestures, that it was a French note of large denomination.

Precisely how he conveyed this information in a stream of words drawn at random from several different languages, principally Arabic, I do not know, but the Sicilian accepted the cloak-room ticket and allowed us to leave.

There was no lack of excitement and incident in the race itself. At one point in the course, or rather I should say for more than a third of it, there is a stiff climb, 26 miles long. This would not have worried the car, for the gradient is not great, had it not been that it was lubricated on the dry-sump principle. This meant that it had one pump to push oil into the bearings, and another pump to empty it out of the crank chamber and return it to the tank. On the level this scheme works to perfection, and it is quite all right for short hill climbs. But so long an ascent as this was too much for this oiling system.

The pump, which empties the sump, is placed at the forward end of the latter. It was not therefore long before this pump began to suck air, as all the oil had run into the back end of the sump. Meanwhile the delivery pump was forcing in oil. The result was exactly as might be anticipated. The crank chamber got about half full of oil ; the big ends of the connecting-rods dipped and splashed it all over the place, and the plugs promptly oiled up. We had to change them every lap.

This enforced delay necessitated increasing speed and taking the villainously surfaced roads in rather an optimistic manner. I do not think either Moriceau or myself are likely to forget the bumping and bouncing we had in this race. Eventually the limit was reached. We crashed into a gulley in the road, and emerged therefrom with a broken cross member and a split radiator. This looked bad, as radiators are not easy things to plug up in the middle of a race. However, we managed to knock it about sufficiently to reduce the leak to reasonable proportions, and as soon as we got to the pits we stopped to take on a supply of water. Moriceau had to carry a 3-gallon keg filled with it between his knees.

We were going as hard as we could up the hill to Campo Felice when we again struck a culvert. The road skirted a precipice. Moriceau and the keg were shot into the air. Moriceau bounced back into the car, but the keg had no luck at all. It disappeared over the precipice and we had to stop and climb down the rocks after it. We recovered our keg, but it had alighted from its aerial flight on its cork, which had been forced in, and no tools we carried on the car could extract it. However, we had enough water left to get us home to the pits.

The Coppa Florio certainly started tragically, for in the first lap Meregalli, taking a slow turn at much too high a speed, ran off the road, and overturned. I was following closely and nearly ran into him. Meregalli escaped with his life, but the unfortunate mechanic was killed instantly. Moriceau and I stopped to lend a hand in lifting the crashed car and the dead man into a place where they would not be in the way of the vehicles still in the race, and then started off again.

Naturally we supposed that the local people would do what they could for them ; but so callous is the Sicilian character that the body of the dead mechanic was still lying where he had been killed at nine o'clock that night. For some inscrutable reason no one had been near it.

As might be supposed, there were a good many mechanical casualties in the race. By half distance there were only six runners left. Boillot was driving well, seven minutes ahead of Chassagne. The latter was really going very well too, but luck was not coming his way. A little after the middle of the race I was going through a village, feeling my way through an enormous crowd which encroached on the road, when out rushed Chassagne. A flying stone had fractured his oil pipe and most of his oil had been spilt on the road. He repaired the damaged tank, but was short of a fresh supply of oil. The only thing he could get locally was olive oil. With this he filled up, and the engine ran perfectly until he reached the pits.

I went on, but it was not long before I punctured a tyre. It did not seem to me that there was any chance of my doing any good in the race after so much time lost, and when Chassagne came up we had a friendly chat whilst Moriceau was changing the wheel. This done, we toured down to the pits together.

It was then I learnt to my intense surprise that I still had a chance of finishing quite high up, as I was by no means the only one who had suffered trouble. Indeed, I had a chance of winning, for there was no guarantee that Boillot's Peugeot would continue to stand the racket indefinitely. So I started to go as hard as I could, and ultimately finished second.

Poor Chassagne again had his oil pipe broken by a flying stone on the last lap. The repair cost him some little time and robbed him of any chance of winning, and to his mortification he found that when he did cross the finishing-line the official timekeepers had gone home.

It will give some idea of the nature of this race, over 268½ miles, when I quote the results :

1. André Boillot, Peugeot, 7 hours 9 minutes 7 seconds. Average speed, 37·5 m.p.h.

2. H. O. D. Segrave, Sunbeam, 8 hours 15 minutes 7 seconds. Average speed, 32·5 m.p.h.

3. Bequet, Peugeot, 8 hours 17 minutes 2 seconds. Average speed, 32·4 m.p.h.

This brought the 1922 racing season to an end. But there was still one interesting event to take place. This was the acquisition of Senor Bertarione as special racing-car designer by Mr. Coatalen. Bertarione had until then been responsible for the design of the Fiat cars which had done so extremely well during the past year. They were undoubtedly very good cars and more up to date than any of their competitors. If proof of Bertarione's skill were required it is sufficient to say that the cars which he built and designed under Mr. Coatalen won every race for which they were entered in 1923.

CHAPTER VIII

1923

The Grand Prix at Tours—A thrilling victory—Why I nearly gave up—England's first win—Prince de Cystria's crash—Heroic mechanics—My narrowest escape.

THE Grand Prix race of 1923 was run over the Tours circuit, and the total distance was, as usual, 500 miles. It was one of the most interesting races I have ever taken part in, and, from a spectacular point of view, probably the best of its kind in the history of motoring.

The Tours circuit is probably without parallel in Europe, and could hardly be bettered, except for the fact that there had been, just previous to the Grand Prix, a race for touring cars which had somewhat cut up the surface and covered it with loose stones. This circuit is unsurpassed for scenery. The roads are occasionally rather heavily cambered, but nevertheless ideal for high speeds, and to make matters better still it was a glorious day for the race.

During a fortnight or so of preliminary practising I had been devoting much care and attention to perfecting my driving, and was concentrating particularly on fast corner work, and to carrying out those repairs which, with greater experience, I found to be inevitable in long-distance high-speed work.

My mechanic was Dutoit, and I will not hesitate to say that, in a race, he is one of the best mechanics I have ever seen. His repair work, filling up and so forth, was perfectly wonderful. Together we used to practise wheel changes for hours on end, carefully taking our time and devising ways and means by which we could gain a second here and a second there. I used to go down the course and systematically clock other drivers on their corner work, analysing the results, and comparing them with my own times.

Meanwhile I had been collecting all the data I could possibly find about previous big races of recent years. So far as long-distance events were concerned I found that it was practically never the fastest car which won. This came as rather a shock to me, as my policy had invariably been in former events to set a tolerably high pace right from the start, and up till that time, whether I had won or no, I had always been lucky enough to manage to do the fastest lap.

After deep thought I decided that on this occasion I would do the opposite and start slow and finish fast. After all, the distance was considerable —500 miles—the pace was sure to be hot, and the life of a racing car shortens in ratio to the speed at which it is driven.

When I mentioned my proposal to the " Patron," as Mr. Coatalen has always been called, he received it rather cynically, but though I feel sure he did not approve, he nevertheless issued no contrary instructions.

I remember also meeting S. C. H. Davis of the *Autocar* a couple of days before the race in Tours and telling him exactly what I proposed to do, and receiving his full support.

However, it is one thing to make plans beforehand but quite a different thing to adhere to them once the race has started. And shortly after the start it seemed as though things were going to be taken out of my hands altogether. My clutch began to slip badly, and lap after lap the car went more slowly. So bad indeed were things looking that I thought it almost out of the question that I could finish, as I felt certain that the clutch would cease to function altogether.

I actually stopped the car half-way through the race to consult with Dutoit whether it would be advisable to retire completely, and so not damage the car too seriously, or to continue as we were and chance some of the leading cars breaking down and thus allowing us to finish reasonably high up.

Luckily, we decided to continue. An extraordinary thing then happened—the reason for the clutch slipping was this. All our clutches had been re-lined the day before the race, and on each car a short length of steel plate had been bolted on to the lid of the gear-box to act as a stop to prevent the clutch pedal from falling on to the floorboards. As the clutch surface wore itself down, so it bedded itself in, and as it bedded itself in, so the pedal came more and more into the car, till finally it butted against the metal stop.

As the clutch continued to wear, the pedal was unable to come further back on account of the stop, so the clutch began to slip and continued to slip for over 300 miles.

Shortly after we had stopped to decide whether we should give up the race, the metal stop suddenly snapped off, the clutch went in with a bang, and I had a car in considerably better condition than anyone else's, because it had never been driven fast and the engine had not been over-stressed.

The actual moment when this occurred was some 70 miles before the end of the race. I calculated my chances of winning and soon realised that there was no possibility of this, because the Fiats had established too commanding a lead, and however hard I drove I could never have caught them, though I had a good chance of finishing second or third.

At this moment Bordino and Giaccone, two of the leading Fiat drivers, were out of the race, leaving the last remaining Fiat driven by Carlo Salamano leading, followed by Divo on another Sunbeam.

After a few laps had been covered, I was signalled from our control station as lying third, close to Divo. From this instant things began to happen. Divo, realising that I was catching him up and having to stop to take on petrol, oil, and water, lost his head at the pits, and instead of loosening his petrol filler cap to take it off, started to force it the reverse way. He struggled and struggled with it till suddenly he realised that he was tightening it instead of taking it off, and started to force it back the right way. Too late! The cap had been forced too far and jammed up solid.

Working feverishly against time, realising that every few seconds meant another mile lost, he and his mechanic Moriceau did everything that human ingenuity could devise, but all without success. Finally they tried to cut the solid brass cap off with a cold chisel, but even this failed. At last they were reluctantly compelled to abandon everything, and had to continue on their reserve tank under the dash, which only held two gallons. This meant, of course, they had to stop every lap to fill it up again.

Meanwhile my own car was going better and better. I saw Divo stopped at the pits and realised that I had passed him to creep into second place.

Even so I knew that I had no chance of winning if Salamano's car continued to keep up the pace he was setting, but precisely at this moment the Fiat pits made one of those tactical errors which cost them the race.

Seeing that I was gradually creeping up on their car, they did not, as they should have done, clock the time I was gaining on Salamano per lap and then multiply it by the number of laps to go, subtracting the total thus arrived at from the lead which Salamano had in minutes and seconds.

Instead of this, the next time he passed he received the signal from his pits to go all out. Had he continued to drive as he was driving, he would have had just sufficient petrol to finish, but the increased speed also increased his consumption and he ran out of petrol on the last lap but one, about a mile from the Grand Stands. His mechanic jumped out and started to run full pelt to the pits. He arrived to find everybody in the Grand Stands as well as the pits keyed up to a state of tense excitement. The red car had not come by the stands when she was due, and rumours of an accident were flying about.

Immediately everyone in the Fiat pits rushed to borrow bicycles. In a few seconds one was found and handed to the exhausted mechanic with a tin of petrol for him to bicycle back to the stranded car.

Meanwhile the pit marshals had been standing by closely observing every move. The rules of the Grand Prix state that once the race has started all work done to the cars must be carried out by the crew of that particular car without outside assistance of any kind, and furthermore all supplies of petrol, oil, and water taken on by any car during the race must be taken on at the pits only, or at any rate must be *supplied* from the pits.

No sooner had the mechanic mounted his bicycle than he was stopped by the pit marshal and told that he must take the petrol back to his car on foot.

Pandemonium broke loose in the crowd of over a hundred thousand people. Many had backed Salamano to win and had no idea of international racing regulations, and a storm of hissing and booing broke out at the officials. The scene baffled description.

While this was going on I was driving as hard as I knew how, but with no thought of winning, till suddenly—and I shall never forget the thrill—topping a rise in the road at about 116 m.p.h. I saw, a few hundred yards away, on the right-hand side of the road, a low red car.

One's mind works like lightning on occasions such as this, and I had plenty of time to wonder whether it *could* be Salamano ; immediately reason said : " Ridiculous even to imagine such a thing ! He's miles in front," Even passing the car I did not trust myself to glance momentarily at the number, so certain was I that it could not be! Yet it was, for no sooner had we shot by than Dutoit letting go everything, and making a funnel of his hands close to my ear, shouted: " C'est le quatorze qui est en panne! Nous sommes en tête! " (It's number fourteen broken down, we're leading!)

I could scarcely believe my ears—for the first time in history an English car was leading in the Grand Prix with only one lap to go.

How can I ever forget those last few miles—every noise in the engine seemed magnified a hundredfold, every corner seemed impossible, my brain refused to work in complete co-ordination with my hands and feet.

I think that of the 27 miles there were to go at least 17 were covered looking backwards over the tail of the car in terror lest some hitherto unknown competitor should appear to snatch victory at the eleventh hour.

But luck was with us and on the next lap we crossed the finishing-line, the winners of the Grand Prix, and the first English entry to finish higher than fifth for the blue riband of the motoring world.

Divo finished second, seventeen minutes later, and only the worst of bad luck prevented Guinness from getting third place. Friedrich on a Bugatti beat him for third place by only two minutes, which was considerably less than the time he unluckily lost through accidentally stalling his engine on a corner, and having great difficulty in getting it going again owing to his valves being badly burnt. However, we had got first and second in the only Grand Prix in which a British car has secured a victory.

The race, as I have said, was full of incident. At the start Bordino, on one of the 8-cylinder supercharged Fiats, went off at an amazing speed. He led for the first eight laps and put up the record circuit at an average speed of 87 m.p.h. Incidentally he was timed officially over 300 metres at 122 m.p.h. It is scarcely surprising that he had obtained a good lead. But he was not destined to hold this very long, for he was forced to retire through a stone flying up and fracturing the base chamber of his engine.

After Bordino's retirement, Guinness took the lead, but he in his turn had to give way to Salamano, as he was then suffering from the same trouble as I, namely, clutch slip.

In the very first lap of the race Vizcaya, driving a Bugatti that looked more like a miniature tank than a motor-car, overshot the corner at La Membrolle, crashed into the palisading which was black with spectators, and killed one and injured a lot more.

An amusing incident occurred while Guinness and I were following Prince de Cystria, an amateur driver of one of the tank-like Bugattis. We were all three entering the village of La Membrolle where, owing to the streets being very narrow, neither Guinness nor I could pass him. We, in turn, were being pressed by other cars following behind, so, to indicate to De Cystria that he should hurry a bit, Guinness put out his clutch and accelerated his engine violently several times.

De Cystria looked wildly round, saw two enormous cars almost on top of him, swerved frantically from side to side of the road and crashed into the palisades.

The last we saw of him was the tail of his car sticking pathetically out of the match-boarding, while planks, scaffolding, poles, and debris rained on his head. I think no one was hurt.

Giaccone, on a Fiat that had shown great pace, retired with a broken exhaust valve.

Some idea of the gruelling nature of this race can be had from the fact that of the seventeen starters only five finished the course. Our speed on this occasion was an average of 75·3, whilst Divo did 71·8, and Guinness 70·5.

After the race was over, I was presented to the "Ministre de l'Intérieur" in the Tribune d'honneur. While this presentation was in progress the band had played "God save the King" and afterwards the "Marseillaise."

Then we went back to the hotel in Tours where we were staying. Never have I seen a town so packed with people. The square opposite the Hotel de l'Univers was one solid mass of cars unable to move. There must have been many thousands. We were given a wonderful reception. The proprietor of the hotel met us on the doorstep with huge bouquets of flowers and wreaths of laurel leaves. (In France whenever you win anything you are always given flowers.) An immense crowd packed the square and cheered itself hoarse.

Personally, I could scarcely hear anything, as I was practically stone-deaf owing to sitting for six and a half hours behind an open exhaust.

To give an idea of the gruelling nature of this race from the mechanics' point of view it is worth recording one or two incidents which occurred to the riding mechanics in it.

When the clutch began to slip on Guinness' car his mechanic Perkins wrapped some wire round the pedal and pulled on it with all his might for some dozens of miles while the car was travelling at about a hundred and ten. The end of the wire which he had wrapped round his hand soon cut him badly, so he undid his tie and fastened this to the pedal instead. Gradually the strain of holding his head forward against the wind pressure began to tell on him, till eventually he almost fainted and had to be helped out of the car and replaced by a fresh mechanic at the pits.

Divo also changed two mechanics, but Dutoit managed to last out the race, though I found that when it was over his right shoulder had been cut nearly to the bone by a steel girder against which he had pressed in order to wedge himself into the car.

My own car was in excellent condition after the race and I drove it back to England.

In September 1923 the Coupe des Voiturettes, or Light Car Grand Prix, was held over the old Boulogne circuit. It attracted a varied field. There were three entirely new 1500 c.c. Talbots, built on the same lines as the large cars which had just won the Grand Prix, and driven by Guinness, Divo, and myself. Two Aston-Martins, driven by Morgan and Eyston, three Bugattis, a Corre La Licorne, three Salmsons, and three Frazer Nash's. These last, by the way, were the only three cars to complete the course as a team, and so were awarded the team prize. Altogether there were twenty odd starters while the weather was delightful.

Our Talbot cars had not been finished in time to give us much opportunity of practising on them, as they left the factory only a few days before the race. But we were quite satisfied that they were far and away the fastest cars in the race.

Guinness, after making a very quick time for the first circuit, had to retire with back-axle trouble, a ball-race having given way. This left Divo and myself to carry on as a partnership, and we were soon able to establish a practicable lead.

Marshall, driving a Bugatti, had particularly bad luck, as within a single lap he had four stops for tyre trouble. I took first place when Divo pulled in, according to plan, to fill up with oil and petrol, and although I had to do the same at the next lap, I managed still to retain the lead through being, with Dutoit, a little quicker at the pits. Just before stopping I was able to establish a record lap at an average speed of 73 m.p.h. I believe this still stands for any size of car on the Boulogne circuit.

Incidentally, the average winning time of this race in 1923 was faster than the fastest lap put up in 1927. Further, Guinness' standing start lap was faster than the record laps for any of the following three years. There is only one conclusion to be drawn, and that is, that these 1½-litre Talbots of Bertarione's were very fine cars. Except for one ball-race they gave no serious trouble of any kind, though Divo had a failure of his magneto-coupling in the tenth lap, which put him out of the race.

As far as my car was concerned, I found it light to handle, but it required all one's concentration as it was difficult to hold on the road owing to its excessive lightness and speed, and the short wheelbase made it difficult to keep it absolutely where one wanted it.

I felt we were taking some little risk when we made our record lap, and having done that we settled down to a slightly more modest pace. Incidentally, in this race I had the narrowest shave that I have ever known in my whole racing career. At one part of the course the road is of the pronouncedly "give and take" variety, and consists of a series of *Montagnes russes* (ups and downs).

At the foot of one of the down gradients the surface had been covered with tar macadam for a distance of about one hundred yards, the rest being granite. I was doing about 105 m.p.h. and realised too late that I was going to hit this change of surface slightly askew. It was impossible to straighten up in time. We hit it partially sideways, turned completely round and shot half off the road, towards a line of telegraph posts. Dutoit was actually preparing to jump from the car, when the tail slightly grazed a telegraph post. This straightened the car up as if by magic, and the next moment we were going straight ahead on our circuit as if nothing had happened. Another half-inch would have meant an accident so serious that one doesn't like even to think of it.

Apart from this the race was a very interesting one, and I was less tired after winning it than after any other that I can remember.

This year, 1923, showed me what an important part the element of luck plays, as in the winning of the Grand Prix at Tours and in the escape related above.

CHAPTER IX

1924

Three great races—Why we lost the Grand Prix—Assaulting the gendarmerie—The girl and the lamp-post—Lee Guinness nearly killed—Crashes at San Sebastian.

I TOOK part in three big races in 1924: the Grand Prix d'Europe at Lyons, the Junior Car Club's 200 miles race at Brooklands and the Grand Prix of Spain at San Sebastian. The first-named was an event to which Guinness, Dario Resta and I had been looking forward with the liveliest anticipation, as this was to be the first occasion upon which superchargers were fitted to our cars. These were 2-litres in capacity—and were of the 6-cylinder type with one pair of valves per cylinder driven by two overhead camshafts.

The circuit was a tricky one. It abounded in corners, and had one fairly long ascent of about three miles with a gradient of approximately one in twelve. This was also a twisty bit, rendered all the more formidable by the fact that if one did happen to go off the road whilst taking one of the sharp bends too fast, one would fall at least a couple of hundred feet sheer before hitting the ground. The circuit was, however, well chosen as a test for acceleration and braking.

The cars which we had to fear principally were the new 12-cylinder Delages with V type engines, the straight-eight Bugattis, of which a large number were entered, the Alfa-Romeos and the Fiats. The Bugattis in particular were interesting, as they had been turned out exactly as though they were ordinary production models, and they embodied many original points, including cast aluminium wheels.

During practice, there was every reason for us to be confident. The cars had been prepared in plenty of time for the race, and they were certainly *au point*. We had no difficulty at all in satisfying ourselves that they were quicker by some seconds per lap than any of the other entrants.

In this race I determined to modify my policy of the previous year, and to set as good a pace as I could from the start. This idea would have worked very well had it not been knocked on the head by circumstances outside my control. As it was, I was lucky enough to manage to do the fastest lap—and that was the end of the race so far as I was concerned. The night before the start a representative of the Bosch Magneto Company had come to see us with a set of new magnetos. We had been doing our practising also on Bosch magnetos, but it was thought by the experts that the new type were superior to those which had already given satisfaction.

The name Bosch is always something to conjure with, and nobody had any qualms when, after a conference upon the matter, it was decided that the new magnetos should be fitted, more particularly as the Bosch engineers asked us to do so. The result might have been different had this course not been taken. As it was I had not done more than two or three laps before serious misfiring set in, and suspecting the plugs I pulled up at the pits and made a change. This, however, was of no avail. The misfiring continued, and applied not only to my car, but also to Dario Resta's, which suffered from the same disease. It was not until quite late in the day that the real cause was discovered, and then it was far too late either for Resta or myself to attempt to win.

I did, however, as I say, succeed in proving that the Sunbeam was the fastest car on the course, which by that time had been badly cut up.

The previous day there had been a 24 hours' race for touring cars, or rather, semi-racing cars disguised as tourers, and the consequence was that what ought to have been a perfect road surface was badly loosened. This is the sort of thing that occurs in Continental racing organisation, and it is hard to understand. Manifestly the more logical thing to have done would have been to run the Grand Prix first, and follow it up with a competition for touring cars. The latter, however, was such an uninteresting spectacle that in those circumstances I suppose it would have attracted no sort of crowd, and the Grand Stand receipts would have suffered.

With Resta and myself utterly out of the race, the only hope was " Bill " Guinness. He indeed drove one of the finest races of his life, and there is no one in the world who can drive better. But his star was not in the ascendant. When there was every chance of him registering another British win in the Grand Prix something serious went wrong with the universal joint of his car, and he had to retire. Meanwhile the Alfa-Romeos and Fiats, Delages and Bugattis were having a duel on their own. The Bugatti team had the worst possible luck with their tyres, a new type adapted for M. Bugatti's special aluminium wheel. Generally speaking, each member of the team had to change his wheels every lap or so, and it was therefore not surprising that only two of them managed to get through and complete the full distance within maximum time.

The 12-cylinder Delages, which most critics had imagined would crack up (their crank-shaft was supposed to turn normally at well over 5000 r.p.m.), did nothing of the kind, but impressed everyone by the smoothness and steadiness of their running. Our old Sunbeam driver, Divo, on a Delage, ran into second place, being beaten by Campari on the Alfa-Romeo by only a minute. The second Delage was third, and the third finished sixth. I came in fifth, twenty-three minutes behind the winner.

Many people have blamed us since for changing our magnetos at the last minute. But there are always certain circumstances when one is forced to take a decision one way or the other, and if one always took the right decision human nature would be a different thing from what it is.

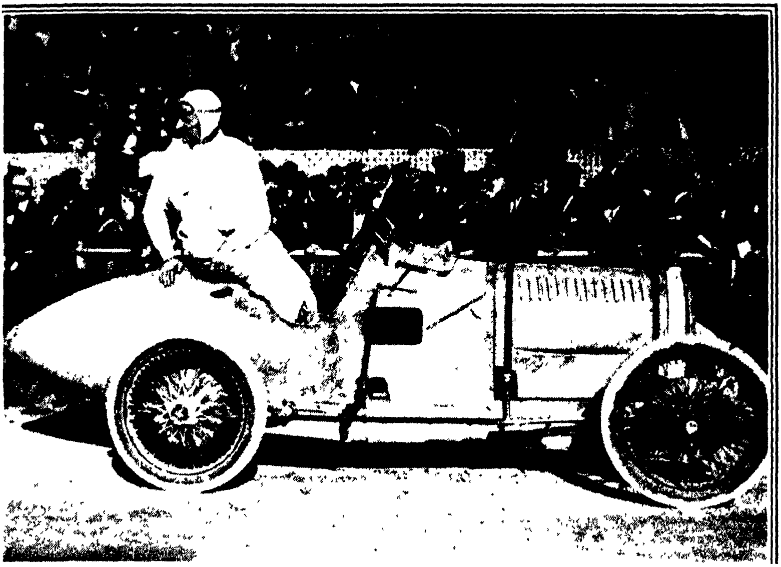
In this particular instance the Bosch engineers said to us: " The magnetos which are at present fitted to your cars are excellent. They will certainly last out the race without any risk of failure, but the new type which we are asking you to fit are, in our opinion, even *better*, and we would take it as a great favour if you would fit them."

Put to us like this we could scarcely do otherwise than fit them.

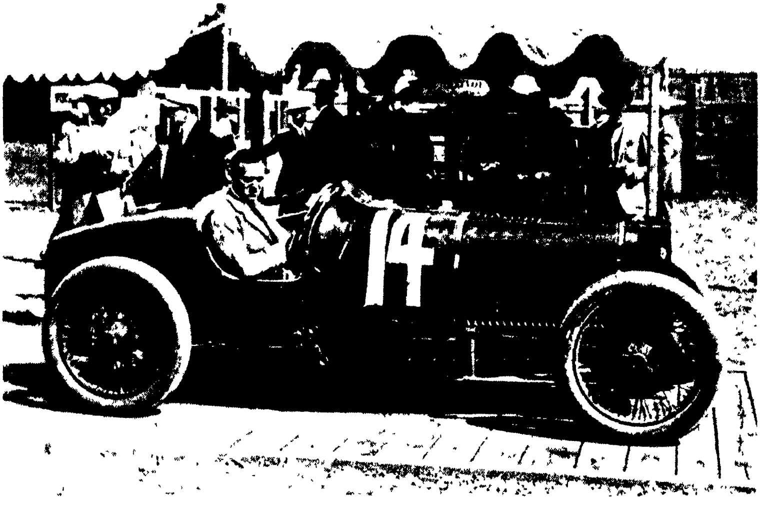
Another peculiar incident happened during the practice period of this race. You may sometimes have heard rumours of cars having been tampered with before the start of a race.

Personally I had always rather laughed at this sort of thing—but the following incident speaks for itself.

Two days before the race I took my car out for a final test run. On the way I suddenly noticed that my oil-pressure needle was flickering. You



J. CHASSAGNE, 1½ LITRE TALBOT, WAITING TO START IN THE PENYA RHIN RACE, BARCELONA



“Autoca

THE LATE DARIO RESTA ON A SUNBEAM AT LYONS, 1924

ANNOUNCING THE TIMES AND SPEED

cannot stop your engine too quickly when this happens.

We stopped and dismantled the oil-pressure valve. To our amazement we found the seating covered with aluminium shavings. This, of course, was serious. We cleaned out the valve, re-assembled it and went on for a short distance, only to have the same thing occur again.

This was now too serious to allow me to drive the car back, and so it was towed to the garage, where the entire engine was dismantled. Eventually we found that a handful of aluminium rivets had *somehow* got into the base chamber of the engine. It was peculiar, to say the least of it.

After working all through the night we got the engine rebuilt in time to go through the weighing-in.

Just prior to the start a rather amusing incident occurred, when everyone's nerves were naturally rather on edge. The Minister of the Interior and several Government officials arrived, preceded by a military Guard of Honour with mounted police. The cars were lined up opposite their pits and the drivers were making last-minute adjustments.

Along each side of the road came a file of police marching level with the half-dozen cars which carried the Government officials.

I did not see this cortège approaching and was standing facing the pits with my back to the road talking to Guinness. Apparently, the drivers and personnel had been asked to get into their pits and leave the road clear. I did not know this and was suddenly elbowed off the road by a French gendarme. I caught my foot on the wooden side of the pits and fell headlong into them. Not appreciating this treatment I scrambled up, let drive at the gendarme and knocked him into a bunch of his friends. He, instead of arresting me, ran off as fast as he could screaming for assistance, and returned in a few moments with an officer, complete with sword, and six more gendarmes who all screamed and gesticulated together, threatening me with immediate arrest. This did not have much effect, as it was a matter of completest indifference to me what they did.

Eventually they calmed down and told me to get back into the pits. I refused, having now become thoroughly obstinate. So they left me, and went along to Guinness, who was standing quietly beside his car, and ordered him off the road. This was too much for Guinness, who never allows circumstances to shake his unruffled calm. Walking up to the officer and pointing dramatically at his car he shouted, " Je refuse à bouger, ça c'est *mon* voiture ! " The joke of it was that it was not his car at all—it was Resta's. Ungrammatical though his French may have been, it had the desired effect on the officer, who marched his men off, discomfited.

Meanwhile, Resta, who had seen this little row, thought that the time had come for him to take a hand. So he walked across to his car, and started up his engine with a roar just as the band commenced to play the "Marseillaise!" During the whole time the French National Anthem was being played, Dario, with a face like a sphinx, solemnly accelerated and decelerated his engine about forty times a minute, drowning the band in a volley of roars and bangs.

During the practice, too, scarcely a day passed without its humorous episode. Ernest Friedrich, Alsatian-Parisian, and more excitable than most, driving a Bugatti, started off one morning to break all records for the lap. He did.

All went well till he reached the beginning of the steep climb out of Givors. Here there is a sharp bend and on the apex of the bend a lamp-post.

Against the lamp-post stood a girl, leaning carelessly on it with one hand. Friedrich saw the girl in the distance and wishing to impress her, took the bend just ten miles an hour faster than it could be taken. He collected lamp-post and girl simultaneously and pulled up in a dense cloud of dust. When the dust subsided, No girl! However, this didn't worry Ernest, who set about straightening up his front axle with the help of the cross-bar of the lamp-post which had broken off. Meanwhile the wretched girl was struggling, wet and bedraggled, out of a reservoir about 80 ft. below the road! She was quite unhurt, except for bruises.

She had been shot over the fence with the top of the lamp!

The Bugatti team, both drivers, cars, and their eccentric "Patron," have always livened the proceedings by providing amusement.

On this occasion Mr. Bugatti, always a man of action, decided that the price he was asked to pay for housing his team and garaging his cars was exorbitant, so he produced a vast marquee for his staff, another for the cars and a caravan for himself! He even had hot water laid on to each of the cubicles for the drivers in the larger of the two marquees.

In contrast to the Grand Prix at Lyons, the 200-miles race organised by the Junior Car Club and run in September 1924, was the most uninteresting thing I have ever known, as far as I was personally concerned. Yet from another aspect it was possibly the most impressive performance in the matter of team consistency ever done, either on road or track. Lee Guinness, George Duller, the well-known steeplechase jockey, and myself were at the wheels of the three supercharged 1500 c.c. Darracqs, which had been specially designed for this race and were new throughout. Although there was a formidable list of starters in the 1½-litre class, including A.C.'s, Alvis, Bugattis, and a Thomas Special, some of which were known to be fast, we never had any doubts about the issue.

The order in which the three Darracqs were to cross the finishing-line was prearranged from the start, and the programme was carried out absolutely to plan. Guinness was to head the trio, George Duller to run second, and myself to follow at the tail. This was our order at the end of the first lap, and it was equally our order at the end of the race. The speed we had to do was 103 to 104 m.p.h., and, with Bill leading, we kept our time with precision. Personally I loathed and detested this idea of driving round and round Brooklands as though the three cars were tied together with a piece of string. I found it hard to obey the orders I had been given, and repeatedly asked myself why I should risk my neck when there was nothing personal to be gained.

However, in cases of this nature the point of view of the firm has to be considered before that of the driver. The firm races primarily for advertisement, or, at least, let me modify that and say that advertisement is *one* of the principal reasons, and the one always put forward to the shareholder when he asks the eternal question, " What's it for ? " and thus year by year displays a greater lack of intelligence. The other reason is research, but research is a word with far too deep a meaning for him.

But when a firm enters three cars for a race and finds that there are no other cars within 15 miles per hour of their speed, it is morally certain that, barring accidents, they will win. But if, on the other hand, their three drivers start to race amongst themselves, it is quite on the cards that all three cars may be broken up completely and thus the company lose the advertisement of finishing one, two, three.

In the Sunbeam and Talbot racing teams we have always had the following arrangement, which is the most satisfactory one to apply under all racing conditions:

In a race where we see that there are cars either as fast or faster than ourselves, our drivers drive their own race. That is to say, they work out their own policy and do as they like. If, however, one of us gets the lead, neither of the other two cars is allowed to pass him so long as he stays in the lead. The reason is obvious. If a man obtains the lead through good driving and then his immediate rivals drop out, enabling him to continue in the lead at a more reasonable speed, he should be allowed to do this, and not be pressed by any of his team mates.

Of course, if he has trouble of any kind the nearest member of the team automatically takes the lead, and in his turn is not allowed to be passed by the third man.

The chances of a racing car finishing the course are always considerably reduced if that particular car has to be driven to the limit all the time, and so this arrangement lessens the risk of engine failure and increases the company's chance of one of its cars winning the event.

And, to revert to the race which I am describing, the advertisement accruing to a company from a race is always increased a hundred per cent if all three cars entered by it finish first, second, and third.

Not one of the Darracq team had any kind of stoppage in this race, and there was scarcely any variation in our lap times. Bill Guinness finished in 1 hour 58 minutes 30⅕ seconds, equal to a speed of 102·27 m.p.h. George Duller in 1 hour 58 minutes 31⅖ seconds, or 102·25 m.p.h.; myself in 1 hour 58 minutes, 32⅕ seconds, or 102·24 m.p.h. All three of us broke the 200-miles world's record in addition to innumerable class records. J. A. Joyce drove his A.C. into fourth place at 92·9 m.p.h.

In this race a bad smash was averted by the narrowest margin. E. B. Ware, driving a three-wheeled Morgan, and going a speed which was certainly impressive with such a machine, flung a tread on approaching the Fork. The tread came off the rim, and entangled the driving chain, locking the back wheel solid. The three-wheeler turned clean round twice before taking a header into the fence on the outer side of the track. All this happened almost under the front wheels of six cars which were following him closely, but by good driving on the part of those at the head of the procession a worse smash was avoided.

On the night after the 200-mile race Guinness and I went off to San Sebastian, where we were to drive a couple of supercharged 2-litre Sunbeams. The course consisted of 35 laps, totalling 387½ miles, of a circuit which looked at first all right to the eye, but turned out to be in an abominably dangerous condition. The corners were supposed to be sanded so as to give the tyres a reasonably good grip. But the Spanish workmen, true to their tradition of avoiding any unnecessary work, discovered that it was very much easier to dig clay out of a neighbouring field and sprinkle it on the road rather than go some little distance off and get the sand which they should have used.

This nearly cost Guinness his life, and led to a crash in which his mechanic, Barratt, was instantly killed.

Just before the race I said to Bill that I proposed to hang back for a few laps and see what was going to happen. There were fourteen starters, representing Germany, Italy, and England, and it appeared to me that on this occasion it would be good policy not to go out too hard at first, especially as I had no great experience of this very twisty circuit. Bill, however, said he proposed to go all out from the drop of the flag. As a matter of fact, as I have noticed in many previous events, Guinness's first lap is usually the fastest. Provided his car runs consistently the later laps will not be much slower than the initial one, but there are just a few seconds difference.

He was taking one of those treacherous turns on a road surface covered with wet clay, when his car refused to answer its steering, left the road, ran up a steep incline on the left-hand side of the road, then turned over three times down into the road again, and finished up against a stone wall on the right-hand side.

Along the right side of the road were telegraph poles and a railway cutting running parallel with it. Guinness and his mechanic were both flung clear of the car the last time it turned over, and actually went *over* the telegraph wires, and fell in the railway cutting.

Barratt, the unfortunate mechanic, was instantly killed, while Guinness suffered severe injuries to his head and legs.

I shall never forget my amazement and dismay when I arrived at the scene of the crash a few minutes later; and then for four consecutive laps I had to pass the two stretchers carrying them to the field dressing-station, not knowing whether my friend was alive or dead.

One's reaction in a case like this is peculiar, because, knowing Bill as I did, I knew perfectly well that he had not turned over through an error of judgment in driving, and therefore something must have broken in his car to cause the accident. As both our cars were identical, it followed that what happened to his car must happen to mine, and so, not knowing what had caused Bill to turn over, I drove the rest of the race waiting for anything to happen. It made me handle that car as though it was made of glass!

This was the first race since the War in which German cars had taken part, and one of them, driven by Mazetti, also had a bad crash. Mazetti had been driving very fast and was leading me by well over two minutes, when it became necessary for him to fill up, and he pulled in at the pits. I passed him as he went away from them, and owing to his having some trouble nearly lapped him, thus actually getting behind him again. Leaving the village of Hernani there is a steepish hill. You shoot up one side and down the other, trusting that there is nothing on the other side of the brow, for you certainly cannot see anything over the top. Mazetti took the rise at a terrific speed, and seeing him do so, I instinctively shouted to my mechanic—" He will crash." With that I slowed down, and breasting the top of the slope saw the ill-fated car crumpled up into a wall, Mazetti having been thrown clear into a field.

One of his brake cables had locked in its guide, thus seizing the front wheel and rendering the car unmanageable.

I was now in the lead, and my car running perfectly I succeeded in winning at an average of 64 m.p.h.

There was not much to spare in it, as Constantini, on a Bugatti, was only 40 seconds behind me, and he was closely chased home by the two 12-cylinder Delages driven by Morel and Divo.

The last event of 1924 in which I took part was the second meeting at the Montlhery track in October, where there was a race for 1½-litre cars. Under the name of Talbot, the Darracqs which Guinness, Duller and myself had driven in the 200-mile race at Brooklands were entered in the 1½-litre class. This sounds rather ridiculous, but in France there is no longer a Darracq. When the Darracq Company was amalgamated with the Sunbeam and the Talbot, the last-named was used to designate in France the products of what had formally been a company called *Automobiles Darracq*.

The word is, of course, pronounced *Talboh*. It is only natural that a great deal of misunderstanding has arisen about this state of affairs, for no doubt many people who have read about Talbot victories on road or track have assumed that the cars emanated from the original Talbot works in Ladbroke Grove. This, however, is not the case. The vehicles can still be called Talbot and yet not have a single component of British manufacture in the whole of their assembly.

To return, however, to Montlhery. What I will call, for the sake of clearness, our three Talbot-Darracqs, had not little serious opposition. There were two Bugattis and the late J. G. Parry-Thomas' Special, and one or two more or less unknown makes, none of which, except those named, seemed to stand much chance. Our three cars, driven by Scales, Bourlier, and myself, practically repeated their Brooklands performance. Scales won from me by a yard, with about a couple of lengths between myself and Bourlier, his average speed for the 300 kilometres being 100·5 m.p.h.

The Thomas Special hung on our tails with great determination for twenty laps, but in his twenty-second lap Thomas had the misfortune to break a rear shock-absorber, and thenceforward his car bumped so badly that he ultimately had to retire with a broken frame.

CHAPTER X

1925

The Grand Prix at Miramas and Montlhery—Rain, thunder, and lightning—The driver who finished second at 100 m.p.h. on his back!—Brooklands—A year of tragedies—An important new rule.

THE first race in 1925 was the Grand Prix de Provence, which was held on the Miramas Track, near Marseilles. The drivers were George Duller, who was driving in our team for the second time, Conelli, and myself, and the cars were the same 1500 c.c. Talbots that had run in the 200-miles race at Brooklands, except that for this race the superchargers had been removed to comply with the regulations.

I eventually won this race with George Duller fourth and Conelli third. Duller was lucky to be able to take part in the race at all, as, when we were driving to the Miramas track in preparation for the race, the former steeplechase jockey ran into a milestone and bent his front axle.

Neither of us had any knowledge of local topography and we were unaware that the road into the track is a sharp right-angle. At this point Duller was doing about 45 m.p.h. But immediately he saw the sign which bore the words "This way to the track," or something to the same effect, he clapped on his brakes and tried to get round. It was, of course, utterly impossible, as the front wheels locked and instead of taking the corner he went straight on! Luckily the car was not seriously harmed, and was quickly put into condition for racing.

On one section of the track there was an artificial hairpin corner built up with concrete. It might be thought that this was a dangerous arrangement, but I am inclined to the view that when any attempt is made to reproduce road conditions on a track, they should be carried out thoroughly, and there are circumstances in which a concrete barrier is preferable to one formed by a heap of sand. The latter looks such a soft thing to run into, that it encourages inexperienced drivers to take liberties on the corner. If they knew they were going to hit something pretty hard they would adopt rather different and more conservative tactics.

Further, if one skids broadside on into soft stuff, there is quite a probability of the car turning over. If, however, one hits something hard and solid, one may damage things like hub-caps and axles, but there is always a good chance that nothing worse will occur.

This Miramas race meeting was rather a mixed event, as four classes were run simultaneously.

One for the non-supercharged 1500 c.c. cars, another for the 2-litre cars, another for the 3-litre cars and another for vehicles of unlimited capacity. In all there was an entry of 42. In the " classement générale " we, that is to say, myself, Count Conelli, and George Duller, finished first, second, and fourth, our 1½-litre Talbots easily beating machines of four and five times their rated power. In our own particular 1½-litre class we finished first, second, and third.

The average speed over a course of 500 kilometres was 78½ m.p.h.

The Miramas track is unbanked. Except for the corner to which I referred, there is practically no banking at all, the rest of the track being exactly like a flat highway. There were plenty of upsets at the hairpin, as many drivers attempted to take it far too fast. A point strongly in favour of the Darracqs was that, with low build, they were very steady on this turn.

The next race was the 1500 c.c. French Grand Prix at Montlhery. This was a straightaway track race, and in a very large measure it exactly reproduced the conditions of the 200-mile race the previous autumn at Brooklands. The distance was, however, 310 miles. The weather was bad, but an enormous crowd assembled. There cannot have been less than 40,000 people in the tribunes and elsewhere when the race started. The competition was not formidable. The only two really fast cars, besides our Darracqs driven by George Duller, Count Conelli, and myself, were the Eldridge Special which E. A. D. Eldridge drove into fourth place, and the Thomas Special driven by J. G. Parry-Thomas. The latter, however, after going consistently and hanging on to the Darracq's tails for about 90 laps, was obliged to retire.

In the latter half of the race the rain was blinding, and was accompanied by thunder and lightning. To one's physical discomfort was added the fact that the track did not provide much tyre hold, and there were one or two serious-looking skids which fortunately ended happily. Our Darracqs were running without superchargers, but even so they had little difficulty in attaining over 110 m.p.h.

This 1500 c.c. Grand Prix was memorable for one of the most amazing incidents that can ever have happened in motor racing. At the very last minute, within a few yards of the end, Conelli was almost level with Duller and on the outside. Duller skidded slightly outwards as he came into the straight and Conelli swerved out to avoid him. He could not, however, correct the skid into which he went on the wet track and cannoned into the retaining wall at about 106 m.p.h., collecting one of the track officials on the way and unfortunately injuring one of his legs so badly that it had to be amputated.

The car immediately overturned and *Conelli shot over the finishing-line in second place on his back with his car on top of him at over* 100 *m.p.h.!* It took all the skin off his back, shoulders, and head, but he was not seriously injured. To-day he is still driving racing cars, and is as well as he ever was.

Duller won by a few yards, whilst I finished third, a complete lap behind, having had to cope with a series of tyre troubles. This, it will be noted, was the fifth occasion upon which our team of cars had taken first, second, and third places in an international race. The fastest lap was done by myself at the rate of 108 m.p.h.

The next big event of the 1925 season was the Grand Prix at Montlhery. This race was over a distance of 1000 kilometres (621 miles), and two-thirds of the track was used in conjunction with a road circuit, making a total of 7·7 miles per lap. This had to be covered eight times. The drivers of our teams were Mazetti, Conelli, and myself.

The race from the driver's point of view, and probably also from the spectator's, was unpleasant, as it poured with rain the whole time. Another thing which reduced my own interest in it was the encroachments, as it were, of the track upon the road. It did not seem to me that a hybrid event of this kind was either as straightforward as an ordinary track event, or as good a test of driver and car as an out-and-out road race. On the other hand, the race would have been well worth winning, for the Automobile Club of France had put up some fairly handsome prizes—150,000 francs for first, 30,000 francs for the second, and 20,000 francs for third.

This, I think, was the first time that attractively large sums were offered for competition in Europe.

The big figures which can be earned by racing drivers in America are said to be the reason why the tracks over there draw huge crowds, thereby bringing financial success to the promoters of meetings. As to that I am not sure.

This Grand Prix was marred by the death of Ascari, whose accident I have fully described elsewhere.

As soon as Ascari's death was announced the two other Alfa-Romeo's driven by Campari, who was leading at half distance, and Brilli Peri were withdrawn. This let Benoist on his Delage into the leading position, which he retained to the end, winning the first Grand Prix for France since 1913, when the Peugeot carried off the honours at Amiens.

In October 1925, the annual 200-mile race was again held at Brooklands. On this occasion an interesting innovation was tried, though its success was a foregone conclusion. This was the formation of artificial corners on the finishing straight, a second corner being provided by the sharp turn at the Fork.

All things considered, this race was probably the most successful event ever promoted in this country, and there can be no question that the idea of imparting the characteristics of road racing, although only to a slight extent, into a race at Brooklands, was most successful, for I have not the least doubt that all records for attendance at the track were easily broken on this occasion.

Three Darracqs were entered, driven respectively by Count Conelli, Mazetti, and myself. Our principal competitors were the Thomas Special, the new straight-eight front-wheel drive Alvis, an Aston-Martin or two, and a sprinkling of Bugattis, and other makes, totalling nearly forty cars in all.

Any hopes of once more scoring a one, two, three victory were soon dashed to the ground, for Conelli retired in the first lap or two with back-axle trouble, and was unable to continue. The front-wheel drive Alvis, driven by Major Hervey and the Earl of Cottenham, showed a good turn of speed, but the failure of its valve-gear and lubrication difficulties soon robbed it of any chance. In the meantime Mazetti and I had gone ahead with myself in the foremost position. The two cars ran absolutely perfectly, and indeed so conspicuously so, that driving in this race was simply a case of doing the same kind of circuit and the same two turns over and over again. Eventually, I won in 2 hours 35 minutes 14⅘ seconds, with an average of 78·89 m.p.h. with Mazetti second in 2 hours 35 minutes 16⅗ seconds at a speed of 78·88 m.p.h. If we could not quite manage to sustain the Darracq tradition, at least we satisfied the first two-thirds of it.

This year was notable in that it marked another of the big changes which take place from time to time in international racing.

Every now and then far-reaching decisions are taken by the International Federation of recognised Automobile Clubs which governs international racing, and the rules undergo drastic revision.

The autumn of 1924 was remarkable for the number of fatal accidents which occurred, among them the most notable being the deaths of Jimmy Murphy and Joe Boyer in America, of Dario Resta at Brooklands, Count L. Zborowski, and Giaccone at Monza, and Lee Guinness' accident at San Sebastian when his mechanic was killed, and a score of others.

The Commission Sportive of the French Automobile Club began to study the question seriously with the object of discovering whether it was possible, either by altering the design of the cars or by eliminating the mechanic, to lessen the risk. After long deliberation it was decided that the mechanic must be dispensed with in the future. Personally, I was much against this at the time, because I had always picked my mechanics with great care so that they could be of real assistance to me in the event of anything going wrong.

Not only that, but, according to one's character, a mechanic may or may not have a distinct psychological effect on one's driving.

However, the Federation's argument was, that the mechanic was the first person to be hurt in an accident, as he in all probability would be thrown out, while the driver, having his steering wheel to grip, had a better chance of saving himself.

There remains one point which all the argument the Federation can ever produce will never manage to overcome, and that is, that the mechanic's main duty is to keep a constant watch behind for overtaking cars, and to warn his driver by a tap on the shoulder, in order that the latter may give way to the faster car. If there is no mechanic on the car to fulfil this task, the driver is forced to look round himself—*the most fatal error that a racing driver can commit*—because, travelling along an ordinary road at between 100 and 120 miles an hour, your car covers a great many yards per second, and as you turn your head to look round the tendency is to twist your body, and so your wheel, in the direction in which you are looking. Thus, there is ample time for you to leave the road completely before you have had time to look round again and regain your bearings.

Under the new ruling, each car must be fitted with a specially constructed mirror of a minimum diameter and placed in such a position that the driver can look into it from time to time to see if he is being overtaken. That this rule is childish is fairly obvious to anyone who knows anything about racing, because the vibration on the dashboard of a racing car, where the mirror must be fitted, is so great that the driver sometimes finds it impossible to read even his instruments, let alone see anything in a mirror, which needs to be absolutely rigid before any clear vision can be seen in it.

However, racing cars to-day have mirrors and no mechanics, yet the mortality figures are lower, so one useful purpose has been served.

CHAPTER XI

1926

Speed records at Southport—152.3 m.p.h.—When the car flew!—A comedy of the curious—A close finish at Miramas—The Spanish Grand Prix—My narrow escape—A broken front axle at 90 m.p.h.

ABOUT the middle of 1925 Mr. Coatalen expressed an interest in seeing what was the maximum speed which could be obtained with a racing car outside the limit of capacity that had been imposed in the events of the last few years, but at the same time of quite reasonably rated horse-power. By this, I mean something comparable to ordinary touring-car standards. Presently the conception began to take definite shape, and a car was put in hand at the Sunbeam Works.

Briefly described, it was to have as its motive power a 12-cylinder " V " type engine, consisting of two sets of cylinders, each of 2-litre capacity, which had been originally designed for the Grand Prix car two years before, bolted to the same crank case at an angle of 75°. The bore and stroke were 67×94 millimetres, the total cubic capacity 3978 c.c., and the R.A.C. rating of the motor

33 h.p. Fitted with a Rootes type of supercharger, the engine gave 296 h.p. at 5000 r.p.m., and approximately 306 h.p. at 5300 r.p.m.

The theoretical car speed at this rate of revolutions with a gear ratio of 3·5-1 was 160 m.p.h. The empty car weighed 18 cwt. There was a very good reason for keeping the weight down as low as possible, for from the start it was seen that some difficulty would be encountered in finding anywhere in Britain a course upon which this car could be fully extended. It was therefore of the highest importance that it should have rapid acceleration in order to attain its maximum speed quickly, and the lighter the car, the better its power-weight ratio, and therefore its acceleration.

At Southport there is a stretch of approximately seven miles of sand, which, of course, is a sufficient distance for a car that should attain its maximum speed within a mile or a mile and a half of the start. However, the sand is not above criticism so far as its surface is concerned, and is only fit for really high-speed work about six times a year, when the wind and tide conditions are favourable. I had, however, little doubt that this comparatively small car, rated much lower in power than thousands of ordinary touring cars, and a mere runabout compared with some of the monsters that have been used for the creation of world's records, would successfully put up new figures.

For the flying kilometre and flying mile I had to beat 150·778 m.p.h. and 150·766 m.p.h., these records having been set up by Captain Campbell on a 350 h.p. Sunbeam. I was also to attempt the flying five-kilometre and flying mile records which then stood at 137·524 and 133 m.p.h. respectively. It was also hoped that there would be space enough for attempting the ten kilometre and ten-mile records.

Before describing the actual record itself, it may be of interest to the reader to know that the creation of a speed record does not mean that the driver goes out with his car on to the sands, or wherever he is going, to do the record, and that two of his friends go out with him, carrying stop-watches in their hands to clock over the estimated distance.

There is an international body governing all automobile records, with offices in Paris. It is called the International Federation of Recognised Automobile Clubs. This body has for the past few years drawn up a series of water-tight rules and regulations with which any attempted record must comply before a certificate of performance is granted.

Some of these rules are worth mentioning. For instance, it would be comparatively simple to choose a long, straight stretch of ground with a downhill gradient, wait until one had a full gale blowing down the stretch, put sails on the car, and create an entirely fictitious speed. By thus reducing the conditions to absurdity one can visualise that a speed attempt with the help of other elements than that of the motive power of the car would not be a genuine test of the car's performance.

Consequently, one of the principal rules of the Federation is that the measured distance over which the car's speed is timed must not have an average gradient of more than one per cent, and the distance must be covered in both directions, the two runs taking place within half an hour of each other, and for the purposes of the record the speed taken is the average of the two runs.

The distance must be surveyed in two directions by an authorised surveyor, and his certificate, with another certificate from a body certifying the surveyor to be a fit and proper person to make the survey, must accompany the certificate of the timing of the record submitted by a recognised automobile club of the country in which the record takes place.

Furthermore, once the car has started on its record run no part of it which might have any bearing on its speed in either direction is allowed to be touched.

The time occupied in covering the distance must be registered by an automatic device, accurate to within one-hundredth part of a second, and a certificate of the accuracy of the device used for timing given by a responsible body of the country (in England, Kew Observatory) must be submitted with the record of the time taken to cover the distance. From this record of the time taken, the speed is calculated to within three places of decimals.

It will be seen, therefore, that the making of a record is not an easy matter, and that once the record is obtained and a certificate granted by the International Federation it is an accurate statement of fact and not one arrived at by hypothetical conclusions.

The then holder of the mile and kilometre records was Captain Malcolm Campbell, who made the record with a 350 h.p. 12-cylinder Sunbeam car, and it was therefore no easy task to defeat the standing figures with a car of a nominal horse-power of 33. Only by designing a super-efficient engine, so efficient that it would be somewhere in the neighbourhood of the same power as the big Sunbeam, would it be possible to obtain the same speed.

As I have mentioned, the car was fitted with a single supercharger, and early in practice it was found that this was unreliable and we kept having trouble owing to the supercharger casing, which was of aluminium, distorting and allowing the rotating pallets inside it to touch the inner walls of the casing, causing it to break.

In this particular attempt at Southport, we cracked six supercharger casings before we succeeded in breaking the actual record. There was no time to send the car to Wolverhampton to fit two smaller superchargers instead of one, which would have been satisfactory, and so we had to get through as best we could.

I had a long discussion with Captain Irving, the chief engineer, and I asked him to give me three minutes' life in the supercharger, and if he could guarantee this I said it would be enough to let me break the record. He would have preferred to postpone the attempt and take the car back to Wolverhampton, and refit two new superchargers, but it was a question of expense as we had the R.A.C. timekeepers with their apparatus ready, and it would have meant sending them back to London and then recalling them and thus doubling the cost of the attempt.

Eventually, by working all through two nights the mechanics reassembled the supercharger, incorporating the modifications suggested by Captain Irving. The car was actually towed to the timekeeper's box on the sands while the electric wiring circuit and chronograph were checked by the officials.

Hot water was poured into the radiator and the engine started from cold by pushing. Immediately the car was driven slowly to the southernmost point of the marked course, and turned round and driven over the measured distance on little more than three-quarter throttle. The same programme was adhered to on the run from north to south, it being my intention to drive back all out. However, before I had actually finished the run from north to south I had exceeded the three minutes' life, and the blower casing cracked once more.

This was most annoying, because the car had never had an opportunity of showing its maximum speed, but even so we had succeeded in breaking the existing record and registering approximately 152 miles per hour.

Towards one end of the course there was a slight, almost unnoticeable, gulley in the sand, where a stream ran down from the dunes to the sea. This was really responsible for the supercharger casing breaking as soon as it did. The car, when going over this gulley at over 150 m.p.h., left the ground completely for over 49 feet. While it was in the air the engine, of course, raced up and thus caused the damage to the blower.

I had never driven a car at this speed before and the experience was most interesting. When fully extended the car seems to lose its sense of control and the driver finds himself turning the steering wheel through a very large arc before the car answers and any marked change in direction is effected.

An amusing episode occurred while I was taking the car out for a practice run one morning. A leather flap had been fitted to the inside of the dashboard which went over my shoulder and buttoned up on to the back of the cushion in the driving seat. This was to prevent the wind swirling round in the cockpit of the car, creating an eddy, and thus causing a loss of speed.

During the night prior to the trial the mechanics, unknown to me, changed the position of the cut-out switch on the dashboard. Having arrived at the end of the distance over which I was being unofficially clocked, I took my foot off the accelerator pedal to slow up, but was astonished to find no response from the engine, which continued to run as though my foot was still on the throttle. When one is covering the ground at this rate, although one's thoughts co-ordinate with one's action almost instantaneously, yet during the time which elapses between the origination of the thought and the carrying out of that thought by one's hand, a considerable distance has actually been covered.

I instantly started to grope under the leather cover for the ignition switch, but could not find it, and I should think I actually covered two miles before I found the new position of the switch. What had happened was that the throttle-rod to the carburettor had become detached, and being of the butterfly type it remained fully open owing to the suction of air past it into the blower.

Captain Irving made one of his characteristically dry retorts to an over-curious person just after the trial.

The enquirer who, besides hunting autographs, was taking voluminous notes in a little book, rushed up and asked in wonder: "Why was it that Segrave could not find the switch?"

"Well, you see," Irving replied with the utmost gravity, "Major Segrave managed to get out his little book of instructions, but unfortunately pages 143 and 144, which indicated the position of the switch, were stuck together!"

"Oh! I see! Thanks! er—most awfully!" replied the eager one, and down it all went in his notebook!

After successfully beating the existing record the car was sent back to the factory at Wolverhampton to be overhauled, examined, and reassembled preparatory to its being shipped abroad for road-racing work.

Meanwhile the three Talbot-Darracq cars had been entered again for the Grand Prix de Provence, or Hartford Cup race, at the Miramas track, so immediately after Southport I left for Marseilles.

Upon arrival at the works at Suresnes I took a touring car and, in company with Mr. Bertarione, the engineer of the French Talbot Company, I drove down to Marseilles.

The other drivers besides myself were to be Bourlier, a promising young Frenchman, and Moriceau, my old mechanic of 1921. Both were given cars in the race, which was not of first importance, in order to see how they shaped as drivers.

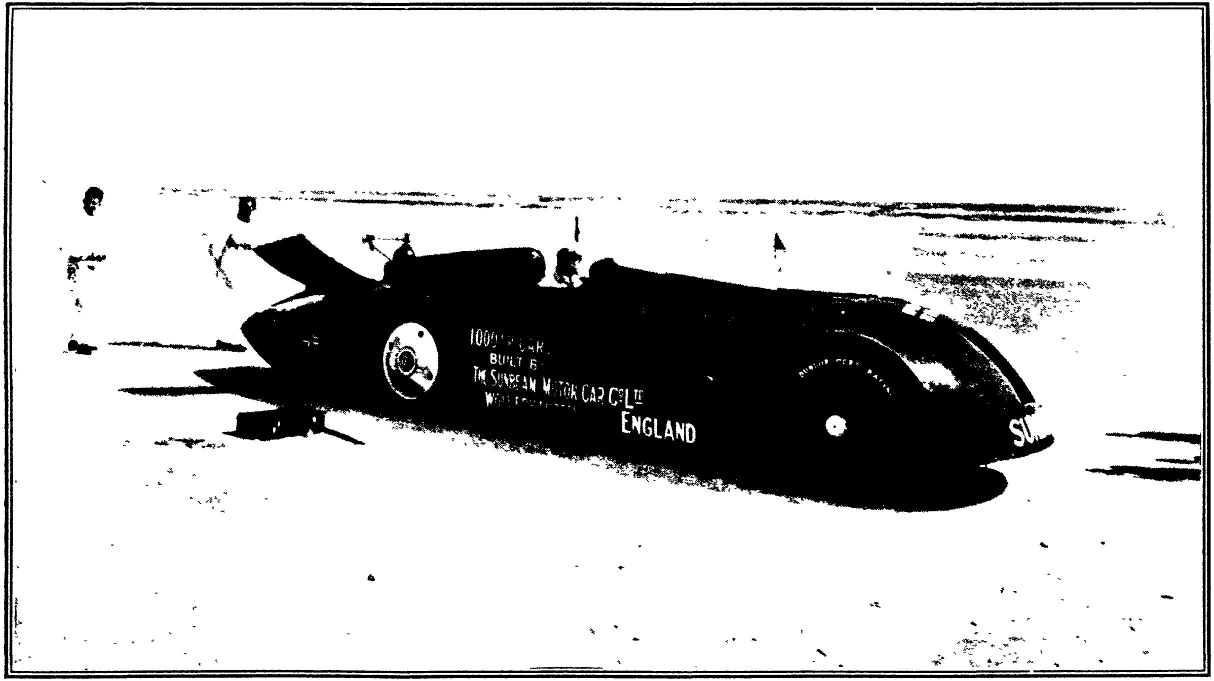
The cars were as entered the previous year, with the exception that they were fitted with superchargers, as these were allowed under the new regulations.

About thirty-six cars were entered, of all sorts and descriptions, in fact, so many that there were eliminating trials over a distance of about fifty kilometres in the morning, the first three in each eliminating heat being allowed to compete in the final in the afternoon.

These eliminating trials are really rather a farce, because the best cars may often be put out of the final, and a good race spoilt, by such things as punctures. The slightest thing going wrong with the car over such a small distance as this will suffice to put it out of the running.

In the race my car did not function particularly well at the start for some unknown reason, and I was lying third or fourth after about six laps when she decided to wake up, and, after spurting for a few laps, I took the lead, which I managed to keep to the end of the race.

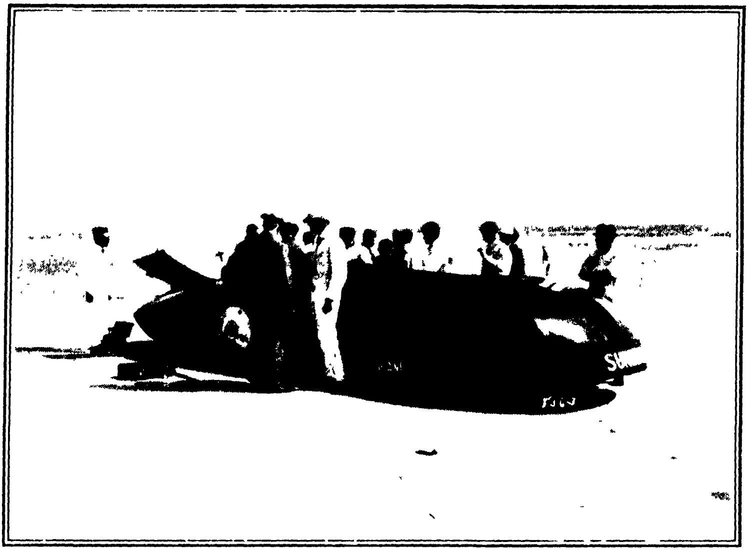
Towards the finish I began to be rather worried by the signals I was receiving from the pits. Every time I passed them I was signalled to go slower and slower. With still ten miles to go, I was coming out of the hairpin corner on the far side of the track—taking things very easily—when I heard the roar of a car's exhaust just behind me. Looking round I saw that it was one of the supercharged Bugattis which, though it was running



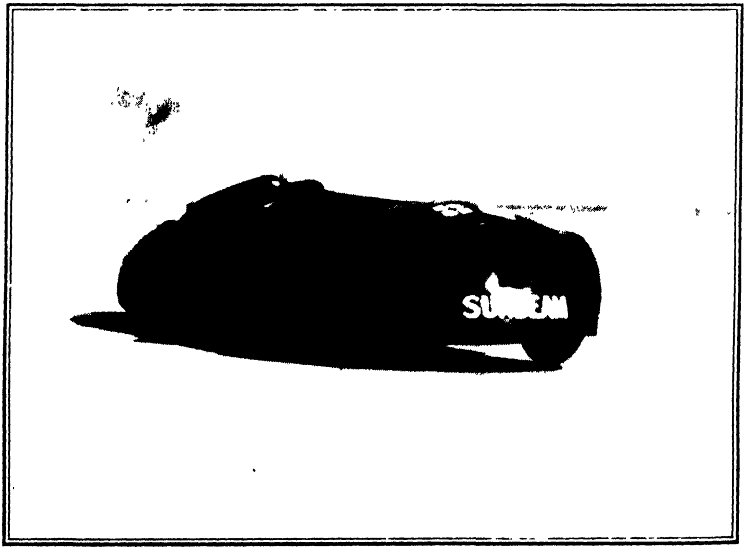
THE THOUSAND HORSE POWER CAR ON THE SANDS AT DAYTONA

Behind the car standing, Lavender and Macdonald two of the mechanics

DAYTONA



WAITING TO START



UNDER WAY

second, I had been leading by about six or seven minutes. Things looked pretty serious, and I stepped on everything, and " turned all the taps on."

As I passed the pits I made frantic signals to them to indicate the position, but, of course, had no time to see whether they understood. When I passed them a lap later, I was amused to see the entire pit crew, engineers, the " Patron," mechanics, and tyre-fitters, all out on the track, waving every conceivable object they could lay their hands on to make me go all out. I needed no encouragement and was going as hard as I knew how, and crossed the finishing-line on the next lap, the winner, to find that the Bugatti had burst or gone over the edge or something, thus letting our third driver, Moriceau, into second place.

When I got to the pits I found that the official timekeepers had made a mistake in the number of laps done as they sometimes do, and instead of my having seven minutes or so lead towards the end of the race as the pit thought, in reality I had something like seven seconds.

I think the Miramas track is the coldest spot in Europe. There is always a mistral about this time of year, and the country is so flat that the wind blows always at the same speed and seems to drill through you after a few days. I was always glad to be *en route* for Paris. The crowd, too, invariably got worked up to a feverish pitch of excitement, which is not pleasant from the driving point of view, as they are by no means well controlled and run all over the track among the cars as they are actually racing.

By this time the 4-litre racer which had done the 152 m.p.h. at Southport was nearing completion at Wolverhampton, and thither I went to see the final touches put to it. It had been entered for the Spanish Grand Prix at San Sebastian in July.

The course had been considerably improved by then and large sums of money had been spent on it, so that it was much faster than hitherto.

One would scarcely describe the 4-litre Sunbeam as an ideal vehicle for fast road work on a course abounding in corners. But in point of fact it handled moderately well, and there was no car in the race that could look at it for speed or acceleration. In these circumstances we had no difficulty in leading the field from the start.

But I was not to go very far. Coming past some Grand Stands on the sixth lap I saw the spectators were behaving in a most unusal manner. They were shouting and waving and pointing, and I realised that something must be wrong with the car. I noticed at the moment that there was something odd about the look of the near-side front wheel. It appeared to be tilting inwards. This, in fact, was exactly what it was doing, and the other wheel was following suit.

I had been travelling fairly fast, but instantly slowed down. But whilst I was still moving at about 90 miles per hour the front axle broke in two, the wheels folded in against the bonnet, and the engine sat down on its sump on the road and tore up a hundred yards of it. By the grace of God the car kept its course perfectly, although it was absolutely unsteerable, and I came to no harm at all, except that when the car sat down on the engine I was flung forward on to the steering wheel and nearly knocked out.

I had amazing luck, because the axle broke almost exactly in the middle. Had it broken on either side, the car would have turned over on that side, but breaking where it did, the ends of the axle dug into the road and helped to bring the car to a standstill in a very short distance.

The opinion in some quarters was that the accident was entirely my own fault, as it was supposed that I had hit a stone with the axle first. This, however, was ridiculous, and there is no doubt whatever, as we afterwards discovered, that the accident was caused by the axle-tube being bored out of centre and consequently being thinner at some parts than others.

The car was returned to England for a newer design and stronger front axle to be fitted.

During this time our new team of cars was being built, in the Talbot Works in Paris; almost unlimited money had been spent on them and many new ideas were incorporated in their design. For one thing, in order that the centre of gravity should be as low as possible, the engine was offset in the chassis and the driver's cushion was placed actually on the under-pan of the car. The object of the engine being offset was that the carden shaft, instead of being under the driver, and therefore governing the level of his seat, was placed alongside him and he could, of course, sit down well below it.

I think that these cars were the lowest racing cars that have ever been built. The highest part of the car came very little above one's knees.

The advantage of having the centre of gravity so low is that the road-holding qualities of the car are immensely improved, and it is therefore able to corner at very high speed.

The cars were entered for the British Grand Prix at Brooklands in August, which is a 500-mile race, organised somewhat on the lines of the Junior Car Club's 200-mile race, in that it had artificial corners erected on the finishing straight. As soon as the cars arrived at Brooklands we found that they were by no means ready. A phenomenon presented itself regarding the braking. As soon as the brakes were applied the front axle started to chatter laterally, with the result that the car was difficult to steer and the braking effect was poor. It was a frightening thing to look at, because one saw the front wheels bouncing up and down about a foot from the ground and the car swaying about in an alarming manner.

As regards speed, pure and simple, we had plenty of it, in fact we were considerably faster than any other car in this race, but in a race of this nature speed is not the only thing that counts. Acceleration and brakes are just as important.

After a few practice laps on my own car, I realised that the cars were not really in a fit state to be run, as they had no chance of winning even though they were much faster than the other runners.

However, various experiments were tried and we did the best we could.

On the first lap of the race an extraordinary thing occurred which usually means disaster for the driver and the car to which it happens.

Moriceau's front axle broke, exactly as mine had done at San Sebastian, but strangely enough the break occurred in exactly the same place, right in the middle. However, the end of his axle was caught up in some way in the frame and did not dig into the ground as occurred in my case, and he was thus enabled to come to a gradual standstill on the side of the track.

Great credit is due to him, because he did not immediately apply his brakes as 99 out of a 100 other people would have done. Had he done so he would have killed himself. One or other of his front wheels would have locked, and the broken ends of his axle would have twisted in such a way that the car would have become unsteerable and he would have crashed.

Our most serious rivals were the Delage team. They had three first-class drivers in Benoist, Wagner and Seneschal, and although their cars were nothing like as fast as ours on the straight, owing to our dreadful brakes, we lost on the corners what we gained on the straight. It was pathetic to see our cars commencing to brake farther and farther away from the corners each lap, until eventually we were applying them almost half a mile away. Even then we were in danger of overshooting the corner when we came to it.

However, it gives one some idea of the speed of these cars when one realises that my car managed to do the record lap of the race, winning the Stanley Trophy, with scarcely any brakes at all.

Divo and I struggled on as far as we could with our cars gradually becoming worse and worse, till we were eventually forced to give up. Divo's car had an oil leak in the radiator and a split supercharger casing and mine had a cracked supercharger.

Still, one cannot win every time and one lives and learns. It was the first time that these cars had been tested out, and one must always experience failure in the initial stages before one can make a new design reliable.

After I had cleaned off some of the dirt and oil from myself I drove down to the garage at the end of the track where Alan Fenn, our racing manager, had arranged a marvellous champagne lunch to revive our spirits.

When I got there I was amazed to see a tremendous row in progress. Everybody, with one common accord, was telling Bertarione, the unfortunate designer, exactly what they thought of him—and trying to eat at the same time! The moment I got inside the room they tried to get me to join in and give my opinion—but I discreetly decided to be an interested onlooker.

These rows are always interesting if one is only an onlooker, because the pandemonium which reigns, when you have a team of foreign mechanics, is truly remarkable. They let themselves go completely. Everybody screams and gesticulates at the same time, and nobody listens to what anyone else is saying; consequently there are about fourteen different arguments in progress at the same time.

Divo was lamenting the fact that a driver of his repute should be so insulted as to be asked to drive a car which burst into a thousand pieces every time he put his foot on the loud pedal, or took it off to tread on the brakes—the result, he said, was the same in either case!

Moriceau was shouting that it was monstrous that an axle should be designed with such a low factor of safety, or if the design was sound, that it should be so indifferently made that it broke within three miles of the start.

Bertarione was leaning against the wall at the far end of the room paying not the slightest attention to anybody, picking his teeth with a piece of straw and waiting for the storm to calm down.

Their voices rose higher and higher, while the excitement increased, until eventually one or other of them discovered that he was not getting an audience : then he would lower his voice an octave, and thus by altering the tone focus attention on himself for a second and gain the attention he desired. Of course, this did not last, because very shortly everybody else followed suit !

Eventually I drove Moriceau, Divo and Bertarione back to their hotels in London and finally left them half-way down St. James's Street, still shouting at one another on the pavement, to the great interest of the passers-by, who, of course, did not understand a word they were saying.

To revert, however, to the race for a moment : The Delage team, who eventually won, had by no means an easy task, because their cars were so designed that the exhaust pipe passed within a few inches of the accelerator pedal and successfully fried the feet of the drivers. Their pits were kept busily engaged passing out buckets of cold water on to the track into which the drivers jumped every time they stopped. One could actually hear their boots hissing as they went into the water.

Seneschal, one of their drivers, caused a great deal of amusement. He said that he hated the sight of Brooklands, or of any track, because he was primarily a road-racing driver. Nearly every time he took one or other of the two artificial bends on the track he succeeded in twisting his car broadside on, extricating himself only with great difficulty, always accompanying his efforts with descriptive gestures which meant having to lift his hands off the steering wheel, leaving the car to its own devices.

However, speaking for ourselves, we learnt a lot from this race, and the cars were shipped back to Paris in order that the modifications which we had found necessary could be incorporated before the next race, which was the 200-mile race to be run over much the same course in September.

CHAPTER XII

1926

Another world's record at Boulogne—The late J. G. Parry-Thomas—Victory at 140·6 m.p.h.—Captain Howey's death—The Italian Grand Prix—When the car was " lost "—A trade record—Another win in the 200-mile race at Brooklands.

TOWARDS the end of August I went up to Wolverhampton to try out the 4-litre car which had been having a new axle designed and built to replace the one broken at San Sebastian. The car was entered for the speed trials at Boulogne at the end of that month.

I did not look forward with much pleasure to this event. The car had been entered for an attempt on the world's record for five kilometres on the road, the previous best figure for which stood at 126 m.p.h. The late J. G. Parry-Thomas had also entered his big Leyland, which, it was known, would do 140 m.p.h. on the straight at Brooklands, and must therefore be regarded as a formidable competitor.

It seemed to me that the job was awkward in every way. It is true I had done 152 m.p.h. at

Southport, but that was on a wide stretch of sand, whereas I now had to let the car out on a comparatively narrow and undulating road.

The distribution of weight, furthermore, was not quite suitable for high speed on a bumpy surface. It had made the car somewhat difficult to handle at San Sebastian, where its maximum speed could never be used, and I was not sure that I could hold it anywhere near its maximum.

At the last minute the distance was changed to six kilometres, and the direction of travel reversed so that no one could gain any advantage from having practised previously.

In the middle of the six kilometres were three switchback hills, and the unpleasant part of the driving was that at speeds of 125 or 130 miles an hour the car was apt to leave the ground. This was nothing in itself, but it was important that when one's car had left the ground it should not turn sideways, or, at any rate, turn out of the straight when in the air, or it would obviously turn over when it landed again. It meant very nice judgment on the part of the driver just before his car left the ground. In fact, one might say that the driver had to control, or *aim* his car so that it left the ground in the middle of the road and landed again in the middle.

Furthermore, the surface was very pot-holey, and tended to make the car jump about all over the place.

This was the first time Parry-Thomas had opposed me in an event of this sort on the road, and naturally there was much speculation as to the result.

Parry-Thomas had always been regarded as the finest track driver that had ever been seen, while I had confined my activities to road racing.

I was worried, because my own car had been given to me with a gear-ratio in the back axle which allowed a maximum speed of 132 miles an hour at a maximum engine speed of 5000 r.p.m. This was because, during the course of a discussion with Captain Irving at Wolverhampton, the latter said that he did not think it would be possible to attain a speed of more than 132 miles per hour and stick on the road. I knew, on the other hand, that Parry-Thomas' car was geared for a maximum of 140 miles per hour, and that it had done this speed at Brooklands over the half-mile.

The night before the speed trial I scarcely slept at all, and kept working out in my mind whether the Leyland would have better road-holding qualities than my own car.

Furthermore, the "Patron" had been in Boulogne the day before, and had told me that I should have no difficulty in making the fastest time and beating the Leyland. I thought to myself, however, that he did not realise the difficulties with which we were confronted, and that this speed trial was extremely dangerous, and that the risk was far too great to be undertaken in an event of such secondary importance.

I do not think he had any conception of the road over which the cars had to travel at such a speed, but I knew that if I were beaten he would want to know the reason why, and, not having seen the road, he would be biased and possibly think that I had not put my foot down.

You can imagine, therefore, that with all these conjectures running through my mind, I did not feel any too well the next day.

I hate speed trials and hill climbs and have always hated them, because they send out the fastest cars last, and one has perhaps four or five hours' monotonous waiting, during which time your engine gets colder and colder before you are given the signal to start. Then the whole thing is over in two or three minutes! One moment's hesitation—one single error of judgment and you are beaten!

This is not a fair test of the car or the driver, because some people's temperaments are such that they cannot stand waiting, and they make a bad gear change or let in the clutch too rapidly and stall the engine. In either case the result is the same.

I was at the starting-line with my car, and my four racing mechanics, Perkins, Ridley, Lavender and Broome, at 8.30 a.m., and I was not given the signal to start until 12.15, during most of which time

I was sitting on the side of the road examining gear-ratio charts, and the like, and trying to work out in my mind what would be the best thing to do ; whether to risk everything and go all out, or to go at a maximum of not more than 130, or a speed which felt almost comfortable, and trust to luck that Thomas' car would not be able to stay on the road at more than this speed. Finally, I decided that the only thing to do was to go all out.

It was a great relief when the starting marshal arrived with the news that everything was ready, and I was next. We started the car up. I drove it away from the start about a mile to warm up the engine and get the oil circulating freely, then I turned round and came back to the start.

The starting marshal stood beside me to tell me I had thirty seconds left. The last ten seconds he indicated on a stop watch.

The engine was running beautifully, and the car leapt forward as the flag fell.

The moment we were under way my faculties were concentrated on the job in hand, and there was no time to think of one's feelings. Even now I have only the haziest recollections of this event. The road seemed like a narrow ribbon lined with thousands of faces on each side and the ribbon became narrower and narrower as the speed increased.

Then came the first of the hills. Up this we shot at over 135 m.p.h. The car seemed only to touch the road in spots. I instinctively realised that the only way in which I could force myself into the seat was by wedging my foot against the throttle-pedal and pressing myself against the seat.

Down over the other side of the hill we raced. One had the unpleasant sensation in the pit of the stomach which one gets when a lift goes down too quickly.

Then came the second hill, which was the steepest. Just before reaching the top the car hit a bad bump in the road, and bounced into the off-side gutter along which it ran for about fifty yards, leaving the ground at the crest of the hill and flying into the air, landing about thirty feet further on. It landed more by luck than judgment, in the same direction as it had been travelling. In a blur I passed the finishing-line a hundred yards beyond, and it was only then that I realised I had been thoroughly and completely frightened for the first time in my life in a car. When I got out I could not stand properly for several minutes. I felt dead tired although the whole thing had taken under three minutes.

Only the blindest luck had seen me through, and I realised that I had been very foolish in attempting to do what was almost an impossibility.

Suddenly up rushed a breathless official from the timekeeper's box with the news that I had averaged 140·6 m.p.h. over the total distance of six kilometres and that I had covered the third kilometre at an average of 148·1 m.p.h., although this did not count for the record as it was only hand-timed. The 140·6 m.p.h. was the highest road speed record ever attained in speed trials and, I believe, still stands to-day unbroken.

Parry-Thomas, being an older man than myself, and therefore, perhaps, having more sense, chose the wiser course of the two and averaged between 120 and 130 m.p.h.

The Boulogne Speed Trials are arranged in rather a curious way. There is a test of speed, pure and simple, as I have just described. Then there is a hill climb up a hill two miles long and another hill climb up a shorter hill.

The winners of the trials are the car and driver who obtain the highest aggregate total of marks for the three events, the marks being awarded according to the time taken over each.

In the afternoon the first of the hill climbs took place up Mont Lombert, which is a hill not far from the town, two miles in length and with three fast corners on it.

I was actually on the starting-line, and the starter had his flag raised to let me go, when a car dashed down the hill all out. The driver pulled up just in front of me blocking the road, and I was starting to protest to the officials and ask for another climb when the two people in the car de Ville I hired a car and went out to see the track at Monza. This track is built in the grounds of the royal park and is the most beautiful automobile racing track in Europe.

It is built as a figure " 8," that is, in two loops : in the inner and smaller loop the corners are banked somewhat after the style of Brooklands, while the outer and larger loop is an asphalt macadam-surfaced road, pure and simple, with ordinary unbanked corners.

I walked round to see the corners ; in fact, I walked all round the track, because by walking, though it is a tedious job, one can memorise the individual details of the circuit much better than if one drives over it.

I soon saw that this was going to be a very difficult track to drive well on, and would require a great deal of practice.

The corners were nearly all fast, and could be taken at over a hundred miles an hour. These are the most dangerous corners, because the car is rounding them nearly at its limit all the time.

After signing various documents and producing all the insurance and third-party policies to the officials and making arrangements about a garage for the car and rooms for the mechanics I returned to the hotel.

Next day the mechanics arrived—but no car ! This went on day after day for three or four days, and still no car ! Meanwhile, we were losing valuable time which might have been spent in practice, but the car and its truck had disappeared into the blue, somewhere near Domodossola and was last seen " flying south."

I could speak very little Italian, and it was like looking for a needle in a haystack to go round looking for a dilapidated refrigerator van containing one racing car and spare bits and pieces.

Finally, I spotted it in an unused siding in one of the subsidiary goods stations in Milan. I went to see the stationmaster, and he told me that when things were lost in Italy they were lost for three or four weeks on end ; in fact, it was quite possible that one never saw them again. In any event, it was unreasonable of me to expect that a truck that had taken two days to get from Paris to the frontier should take less than a fortnight to get from the frontier to Milan—a distance of a hundred miles or so, in comparison with the six or seven hundred miles from Paris to the frontier !

I told him that I thought I could point out the truck to him. He looked at me pityingly, but made up his mind that I was a " mad Englishman " and would have to be humoured, so he came with me.

When I pointed the truck out to him he told me that it contained perishable goods which had been there for three days, whereupon I told him that he was a liar, because I knew that it contained my car. A first-class argument followed. However, he eventually agreed to break the seals—just to see—and there, of course, was the car, a little the worse for wear perhaps—but still—the car!

After a certain amount of trouble we managed to get it on to the ground and then towed out to the track. It was too late, however, to do anything that evening, so we decided to go back to Milan and start serious practice the next morning.

The next day turned out to be extremely hot, the thermometer registering about 105° in the shade. A racing car is never a cool conveyance at the best of times, and the heat inside the cockpit was little short of terrific.

I went a few times round the track to get used to it, and then came in to look everything over, intending to go out again and do a really fast lap. I had done a considerable amount of work on the car since Boulogne and felt sure that it would be capable of putting up some very fast times, if not of breaking the lap record.

Accordingly I started out and, as soon as we got going, put my foot down. I felt thoroughly uncomfortable and scared myself stiff at all the different corners, because the car slithered about a bit, till at last I came into the pits again expecting to hear that I had broken all records. My amazement was indescribable when Perkins, who had been clocking me, came up and said:

"You've not done badly for the first time out, and after a few more practice laps you should be able to go quite fast ! "

I looked at him in astonishment.

" What on earth do you mean ? "

" What I say," he replied.

" What did you clock me at ? " I asked.

" Four minutes fifteen seconds."

" Well, your stop watch must either be too highly geared or else it is not working at all, because I was going as fast as I knew how ! Anyhow, you had better clock me again."

I was thoroughly annoyed, as there is nothing so irritating as to do a really fast lap and then have the man who clocks you make a mess of the time. Before taking the car on to the track I had myself been clocking the Italians, and found that the fastest cars did the lap in between 3 minutes 50 seconds and 4 minutes, so that my time of 4 minutes 15 seconds was extraordinarily bad.

The next time I really set out to take every conceivable risk to put up a really fast time, and on reaching the pits I felt sure that, at any rate, this time I had knocked several seconds off my previous time. Perkins, however, seemed to think otherwise, and he came towards me with his stop watch in his hand, saying, " You are doing better now ! That lap was 4 minutes 2 seconds."

I simply could not understand it and began to be seriously worried. The whole of that afternoon I went round and round the track, but never succeeded in getting below four minutes. Finally, I decided that if I could not put up a better performance than that I would have to withdraw the car, as we would certainly be beaten by not only the good cars, but by the " also rans " as well.

Next morning there were one or two things to be done to it, and while this was in progress I went out alone and walked round the track to watch some of the better Italians cornering, and then I discovered what was the matter with me. On the banked or inner portion of the track, the banking was not very high and there was no retaining wall at the top. If you went too high up on the banking and your car skidded there was nothing to stop you from dropping over the other side. I had realised this, and when driving had always kept the car low down on the banking, consequently the whole of the curve of the track had been taken with the car in a crab-wise position, the back wheels always trying to get in front of the front ones. This, of course, was retarding the speed to a large degree, but appeared the safer course. But, to my astonishment, the Italians were taking the banking at 120 m.p.h. or so with the outside wheels within six inches of the top, whilst I had been doing 80 or 90 m.p.h. with the car all over the place, and low down.

I went back to the pits, got into the car, started her up and went out on to the track determined to try this idea. It was a long time, though, before

I could overcome that "safety first" feeling and manage to force the car as near to the edge of the banking as this. The moment I did so I found that I had taken fifteen seconds off my time for the lap. After a few more practice runs I managed to break the record for the track, lapping at 3 minutes 28 seconds instead of 3 minutes 32 seconds, which was the previous record. This lap speed represents an average of 110½ m.p.h., corners and everything. Having done this we thoroughly overhauled the car and put it away until the day of the race.

This was the following Sunday. There were twenty-three cars competing of various sizes and types. We took the lead at the end of the first lap and maintained it until nearly half-way through, when the aluminium thrust-block behind the gear-box cracked in half and let all the oil out. There was nothing else to do but to withdraw. This was the height of bad luck, with victory in sight, and I had only been driving on half throttle.

Constantini won on a 2·3-litre Bugatti with Goux second on a sister car.

Scarcely was the race over before we had to hurry back to England for the 200-mile race at Brooklands at the end of September. We crated the car the same evening, together with the spares, and shipped them back to England by rail.

The next day the mechanics and I took the

Orient Express to Paris, where I went to the Talbot Works to see about my car, whilst they went straight on to England.

My car was waiting there ready to be tested, so the same afternoon Divo and I took our cars out to Montlhery. This was the first time since August that the cars had been out, and the various alterations which we had asked for had been done. The brakes were 100 per cent better, the acceleration was perfect, in fact the cars were a thoroughly finished and tuned job. This time no detail was overlooked and every precaution was taken to make sure of winning the race, if not of finishing first, second and third.

Among the starters, of which there were about thirty-five, were some front-wheel drive, 8-cylinder-in-line Alvis, some Bugattis, and some Amilcars. In fact, 50 per cent of the cars entered were quite good.

However, our cars, now thoroughly *au point*, were capable of attaining a speed of 130 m.p.h. over the half-mile and were miles an hour faster than anything else in the race.

We had to stop for petrol half-way through but, thanks to the pit arrangements, the filling up was accomplished by pressure and functioned well. Everything went well until Moriceau, who was running third at the time, skidded on a patch of oil, hit one of the artificial sand-banks, shot up to the top and stopped there swaying to and fro like a see-saw. Thus he remained for half an hour, digging into the sand as hard as he could until he dug away sufficient to enable him to get the car going, and finally finished sixth.

My car won, Divo being second, with one of the Bugattis third.

CHAPTER XIII

1927

The world's speed record at Daytona—Why the attempt was made—Building the big car—We sail for America—Parry-Thomas's death.

ALTHOUGH with the 33 h.p. 12-cylinder Sunbeam we had been successful in lowering the world's record for the kilometre at Southport, the figures we created had scarcely been entered in the files of the International Federation before they had to be erased and replaced by new ones. Nor was this by any means unexpected. There were already, at that time in Britain and in Europe, at least three cars which, on paper, were able to exceed 150 miles an hour with comparative ease.

Unlike the Sunbeam they were equipped with engines of very large capacity. In the case of the two English cars to which I refer, exceedingly powerful aircraft engines had been installed in the chassis. It was therefore clearly only a matter of time before one of these monsters would come out to assert the superiority which huge engine power gave it

It will be realised, of course, that when competing for world records of this kind the designer is given complete liberty to fit a 10,000 h.p. engine, if he is clever enough to get such a unit into a motor-car, and, speaking broadly, any device or contrivance which will give him an extra mile an hour by legitimate means is open to his use.

Under these circumstances car design becomes reduced to three particular problems. First, the installation of the power unit; secondly, the transmitting of the power developed to the road wheels; and, thirdly, the reduction of air resistance to a minimum. With regard to the latter it is fairly safe to assume that the air resistance or windage is of very little consequence on a racing car travelling at speeds of under 90 m.p.h. From that point onwards it becomes a matter of increasing moment, for the power absorbed in air resistance increases as the cube of the speed. At 180 m.p.h., for instance, it is 27 times as much as it is at 60 m.p.h.

The length of time my Southport record was likely to last, as we saw from the first, depended upon how long it would be before Captain Malcolm Campbell, Mr. J. G. Parry-Thomas, or Mr. E. A. D. Eldridge had improved the design of their aircraft-engined cars in respect of streamline form.

Mr. Parry-Thomas was the first to register success. He broke the world's record at Pendine

Sands, Carmarthenshire, with his 500 h.p. Liberty-engined car, increasing the record to 174 m.p.h.

Captain Campbell had also put in a lot of strenuous work at Pendine, and although at first he was dogged by ill-luck he eventually succeeded in wresting the distinction from Parry-Thomas, and putting up the record by a few miles an hour.

Before the successful attempt at Southport, Mr. Coatalen had viewed the matter from a slightly different angle from either Captain Campbell or Parry-Thomas. His brain is the kind of brain which is only interested in problems hitherto unsolved, or which present certain unattempted difficulties.

Before the car which I used there was built, I distinctly remember a conversation which I had with him in Paris in which he said: "Let us take a small car of approximately 30 h.p., make the engine super-efficient, experimenting with it to make it develop a tremendously high power output, and also experiment with the stream-lining of the body. Then we will see whether we can beat the existing record of 150 m.p.h."

After Parry-Thomas and Captain Campbell had, with their large engines, increased the record by such an amount I went to see Mr. Coatalen again, and asked him if he thought it would be possible to build a vehicle which would attain a speed of 200 m.p.h. on land.

Now that this speed has been attained, and even exceeded, it does not perhaps sound an insuperable task, but remember that at the time this discussion took place it was the popular belief that a speed of 200 m.p.h. was well beyond the possibility of attainment. The reason for this is that calculations could be worked out more or less accurately up to 180 m.p.h., but after this speed they became problematical, as there was no data to draw upon and one was plunging into the unknown.

Once the three miles a minute has been passed, certain factors come into being, to combat which, there are no known calculations. These factors are brought about by the tremendously increased wind resistance.

Mr. Coatalen immediately became interested in the problem and said, " I have shown what can be done by making a small engine super-efficient. Let us now allow ourselves unlimited engine capacity and take, for example, a 1000 h.p. engine ! "

It is one thing to say, as a figure of speech, " a 1000 h.p. engine," but it is quite another thing to take a unit as big as this and fit it into a car chassis.

When this problem had been considered it was realised that a 1000 h.p. engine as a single unit, with the designs which were available when this discussion took place, was an impossibility. Mr. Coatalen then conceived the brilliantly successful idea of splitting the power unit into two and fitting one half to the front of the car and the other to the back.

A rough lay-out of the design was worked out by him and then handed to Captain Irving to complete and build. Captain Irving is an unassuming but brilliant engineer who has never sought for, or been awarded, the praise that is due to him. It need hardly be said that the 1000 h.p. Sunbeam was by no means his first triumph, as many previous designs had come from his fertile brain. The combination of the " Patron " and Captain Irving is one of the most remarkable ones in the motoring industry, the one providing genius and originality, and the other sound, practical, designing ability and thoroughness.

Thus the lay-out of the car was conceived and the design started. But there are certain factors contributing to the speed of a car which are almost as important as the car itself, and without which speed cannot be attained.

The most important of these are the tyres with which the car is shod. The reader will realise the enormity of our proposal to do 200 m.p.h. when I say that the tyres with which speeds of 170 m.p.h. had been the governing factor had caused endless worry to the tyre manufacturer. When we proposed to add another 30 m.p.h. to this speed the task seemed almost impossible.

However, the Company had promised to build the car, and it was up to me to do the rest. I went to see Sir J. George Beharrell, the Managing Director of the Dunlop Rubber Company. He was very interested in the problem and, in his characteristic way, said : " Give me a few months to determine by experiment whether the Dunlop Company can build you tyres for the record, and if we can I will let you have them, but only if I am myself *completely satisfied* that the tyres will stand up to the terrific strain which will be imposed on them."

A few months elapsed. In the meantime the car was progressing at the Sunbeam factory : I went again to see Sir George. He said to me : " We have built your tyres and I can guarantee you safely 3½ minutes' life at 200 m.p.h. for each tyre." One mile covered at the rate of 200 m.p.h. is 17½ seconds ; double this for both the runs and then add a minute to a minute and a half for the distance on either side of the measured mile over which one had to drive to get up speed, and this was under the time limit, therefore the tyres were all right.

Sir George had gone to a great deal of expense to construct these tyres, and a specially designed machine had been installed at Fort Dunlop to test them out while they were revolving at a speed of over 200 m.p.h.

I record this episode as indicative of one of the many problems which were only overcome through the unfailing support which the British accessory manufacturers gave me.

I do not suppose there has ever been a single car designed in which so many unknown quantities had to be dealt with and allowed for. Never before had the attainment of such a high land speed been aimed at. Never before had such power been put into a car chassis, and never before had it been necessary to break away from orthodox car construction to such an extent, yet the fact remains that this car was submitted to fewer alterations in design than any other car I know of.

From the first I had no doubt whatever that the car could obtain the terrific speed it had been built for. I shall never forget my sensations when I first heard its engines running " all out " in a " cradle " at the works at Wolverhampton. The whole enormous body, looking like a mechanical nightmare rather than the product of human hands, was gripped in a vice-like contrivance with its wheels off the ground.

The engines were started up and the whole building shook. No words can describe the unimaginable output of power which the 1000 h.p. machinery seemed to catapult into the building. It was one continuous deafening roar. The very walls quivered, while the tiles on the roof seemed to dance.

The wheels were spinning round like semi-visible discs at 210 miles an hour. Even then we knew that the engines behind them were not putting forth all they were capable of.

I think I stood and stared at the monster rather as a child would have done. Racing cars I had seen and driven by the dozen, but this was something more gigantic than any yet dreamed of. It fascinated me.

The thought that I was to drive it, control it, unleash all its potentialities was, one must admit, a little unnerving.

It is the only time I can honestly say when I have stood in front of a car and doubted human ability to control it.

These impressions, however, lasted only for a short while. I was determined to achieve the record I intended to set up, and I knew this car was the only one which could do it.

Even to-day I can say that its full potentialities were never shown. It was capable of an even greater speed than the 203·7 miles an hour which set up the world's record. Of that I speak later on.

As we shall see, there was only one point to which failure occurred, and that was something which in even such far-sighted people as the "Patron" and Captain Irving could hardly be expected to avoid error. I think that designers will agree with me that the arrangement of the transmission of this car was itself a triumph of ingenuity. The rear engine was fitted with a compressed-air starting apparatus, and when it was in motion it could be used to start up the front engine with the aid of a slipping clutch. When the two engines were running at an equal speed they could be connected by a positive dog clutch and then driven from a common accelerator pedal as one unit.

In order to allow the gear-box to be kept as small in size and as low in weight as possible it was necessary to increase the gear-shaft speeds in order to reduce the torque, but once the gear-box speed had been increased it was necessary to reduce it again for the final transmission. The gear-box, therefore, was geared up to one end and geared down at the other. The final transmission was by bevel to a cross-shaft and thence by chains to the back wheels. It had all along been recognised that the presence of these chains, by reason of the stress to which they were subjected by centrifugal force, would always be a potential source of danger. A broken chain travelling at a speed corresponding to 200 m.p.h. would be a projectile of almost irresistible force.

Allowance was duly made for the possibilities thus entailed, and from the very first the design comprised chain guards of steel armour plate, which could be relied upon to limit the damage if the chains did come adrift.

Once the design had been started, the second problem arose of where the attempt should be made. The same figures which had shown that

200 miles an hour was practicable equally indicated that 4½ miles would be required for the attainment of this speed, and approximately the same distance would be required for deceleration after that speed had been attained. By the time the starting and stopping distances had been worked out and the measured distance for the record added it was found that the total distance required was over nine miles.

Ordnance surveys of the British Isles, maps of France and other parts of Europe were hastily consulted, only to be abandoned. Little enquiry was needed to show that no stretch of sand in Europe was either long enough or otherwise suitable for a 200-mile-an-hour attempt.

It will be borne in mind that the 1000 h.p. Sunbeam was in many vital matters different from all other cars. The mere fact that it had one 500 h.p. engine in front and another behind meant that it could practically only be driven full out on a dead-straight course. As the engineers say — the moment of inertia of the vehicle in the horizontal plane was very high.

To the non-technical reader I would translate this as indicating that when you start to swing a big see-saw with a heavy weight at each end, it is very difficult to check its swinging beyond the amount which one intends.

In several places it was possible to see that a stretch of sand long enough for our purpose existed.

But if it was also straight enough it was almost certain that it would not be smooth enough.

My experience at Southport, when doing the comparatively moderate speed of 150 m.p.h., had clearly shown that smoothness of the course was a consideration of prime importance. To attempt to go over bumps and hollows at 200 m.p.h. would have been as certain to lead to catastrophe as to try to avoid them. In these circumstances little time was lost in coming to the decision to make the famous beach at Daytona, Florida, the scene of our new attempt upon the world's speed record. It is almost dead straight for 23 miles and 500 yards wide at low tide. It was, of course, easy enough to select the venue, and getting the car and the necessary crew of mechanics over to America presented no difficulties at all. But it was not just simply a case of shipping the car, doing the record, and coming back. There were a host of preliminaries to be arranged, the volume of which almost staggered me when I went into them. There were such trifles as our having to get the permission of the American authorities to make the record attempt in their country, and equally the permission to use Daytona Beach. This is a public beach and one cannot expect, as an alien, to cross the Atlantic and make exclusive use of it for weeks on end.

Here I would like to say how intensely grateful I am to all the American organisations with whom

I was brought in contact on my record attempt. The burden of the entire arrangements was thrown upon my shoulders. All negotiations had to be done by myself personally, and an immense amount of work was involved. In these circumstances I am better able to appreciate the never-failing kindness and sympathy of the Americans.

Permission for the use of the Beach was instantly given, and from that time forward it really seemed as though those on the other side of the Atlantic who were concerned with the attempt had determined to break all records for hospitality. The arrangements which I had to make opened promisingly enough, but there was one very big snag. This was the fact that records laying claim to the title of world's records must be accepted and passed by the International Federation.

Now the Americans did not belong to this organisation, which otherwise includes representatives of the leading countries. Obviously I could not take to America with me a whole department of our own Royal Automobile Club to certify my speed, and it was accordingly absolutely necessary from my point of view that the Contest Board of the Automobile Association of America, the paramount motoring body over there, should receive authority from the Federation to certify the tests.

My problem was therefore to get the Automobile Association to sign the international agreement. Furthermore, the R.A.C. had notified me that the record could not be considered as a world's record unless the Contest Board joined the Federation before the attempt was made.

As evidence of the excellent spirit of sportsmanship shown by them, they agreed to come into the Federation without delay. But here again another obstruction presented itself. The Federation raised the objection that the American Association was using an electrical timing apparatus to which they could not give their official approval until they received full particulars of it. This presented more difficulties, because the Federation officials called for a certificate as to the accuracy of the American apparatus from the Federal Bureau of Standards, and this also required a second certificate from some independent body.

I should scarcely have been surprised if the American Contest Board had sent a very terse reply to the European officials. It was much as though President Coolidge had landed at Southampton and had been held up by the Home Office officials until he could establish both his identity and his *bona fides*, or as though the Greyhound Racing Association had refused to admit the existence of the Jockey Club until it could come forward with documentary proofs of its integrity.

The Secretary of the Contest Board, Mr. Haresnape, never wavered for a moment in his kindly attitude towards my attempt. He procured and sent the required documents at heavy cost to himself without any delay whatsoever. They arrived and were accepted by the Federation in time through the persistent efforts of Colonel Lindsay Lloyd of the Brooklands racing track, Commander Armstrong of the R.A.C. and Colonel Mervyn O'Gorman. These three gentlemen went over to Paris and used all their influence to get the American system of timing passed. Had it not been for their assistance I think that there is no doubt that our attempt would have fallen through.

Here it is necessary to explain why it was that I had to carry out all the preliminary arrangements. The people with whom I was collaborating thought that a successful attempt to accomplish 200 m.p.h. could be made in the British Isles. I was equally certain that it was out of the question, and after all, I considered myself the best judge in the matter, as it was my neck which had to be risked.

There was no serious disagreement on this point, but the upshot was that I took the 1000 h.p. Sunbeam car to America upon my own responsibility and at my own expense. This, of course, meant that the record had to be done within a limited time, and it is for that reason that I am so intensely grateful to the American authorities, who did so much to expedite things and smooth the way to our ultimate success.

Accordingly, on March 2nd, the car, equipment, spares and mechanics were shipped on the

Berengaria, and I sailed in company with Bill Guinness, who, like the sportsman he is, joined me at the last moment with Lord Rossmore and Mr. N. H. Freeman, the Experimental Engineer of the Dunlop Company.

The night before I was due to sail for New York the Cunard Company rang me up to say that they had no crane at Southampton large enough to put the car on board the liner. This will give some idea of its enormous size.

It was 28 feet long, and weighed nearly six tons when packed in its crate. Finally, the Steamship Company had to hire the Southern Railway's floating crane and tugs before they could take it on board.

At last everything was settled. The car was shipped on the after-deck of the *Berengaria*, and the 3-litre touring car which we were also taking with us was safely packed away below decks. The twenty-one crates of spare parts were stowed away. The mechanics arrived on board, and we sailed on Wednesday, March 2nd.

I had thought that after all the worry and trouble I had gone through in making the arrangements single-handed, I could have six days' peace at sea, and settle down: but this was not to be the case.

Three days out came the distressing news of J. G. Parry-Thomas's death, while attempting this actual record on Pendine Sands, Carmarthenshire.

A close and valued friend, it goes without saying that his death affected me deeply. Furthermore, it did not appear to be a good omen for our own attempt.

I could get no information whatsoever as to what mechanical failure in the car had caused his death, as nobody seemed to know, at the time. We understood that it was through breaking a driving chain, but why it broke, and what the immediate effects were, we had no means of finding out. We all turned this over in our minds and decided to inspect the car thoroughly when we reached Florida and see that our own chains, as far as we could know, were in a satisfactory condition of adjustment.

CHAPTER XIV

MY ARRIVAL IN AMERICA

The arrival in New York—Daytona's welcome—My Press manager—Preliminary tests—207 miles an hour—What it felt like—The record of the times and of the car.

I ALWAYS think that to the weary traveller who reaches America after six days at sea the sight of the statue of "Liberty," at the approach to the city of New York, creates a very deep impression.

Furthermore, after what one is used to in Europe in the way of cities, the sight of New York's enormous skyscrapers, with the absence of the smoke and dirt, so usual in large cities, is one not likely to be forgotten.

We anchored at Quarantine, and it had been our intention to go up on to the upper deck of the *Berengaria* and watch her being berthed at the Cunard Company's dock. But this idea was soon knocked on the head, as our state-rooms were invaded by an army of Press reporters, the net result of which was that neither I, Guinness, nor Rossmore saw anything at all of the approach to New York.

On arrival at the quay-side there were even more reporters, and questions were fired at us from every side. We were asked whether we had had a good trip, what we thought of New York, what England thought of America, when there would be another World War, and, in fact, every conceivable sort of irrelevant question imaginable.

After eventually breaking through this cordon, we were met by the manager of the Biltmore Hotel, who took us up-town. To the Englishman who has never visited America there is always the feeling, latent in his mind, that America is a modernised edition of England, with the same language, and the same common view-point; but this is absolutely not the case, and the sooner that we in England understand this the better it will be for our mutual relationship, in the future.

America is a totally different country; the language, even, is different. The average Englishman, stranded in the Bowery, would have about the same chance of making himself and his wants understood as the man in the moon!

One is appalled at the bigness of everything. Take the hotel, for instance. As far as I remember, we were on the fourteenth or sixteenth floor. But even so, with all the other surrounding buildings equally large by comparison, one does not notice their huge height. After all, everything in this world is a matter of comparison, and if the Biltmore Hotel were placed in, say, Regent Street, it would certainly dwarf everything in the surrounding district; but place it among other buildings equally tall, if not taller, and it does not appear in any way out of the ordinary.

Scarcely had we arrived, however, than the fact that privacy is a thing unknown in New York was made known to us. We told the management downstairs that we were not in, but the reporters, upon receiving this information, came up in the lift and walked straight into our rooms, nothing daunted.

We had, really, very little time to see anything of New York, because we were so seldom alone.

Also there was a certain amount of trouble with the Customs which had arisen in connection with the car. I had declared the value for the purposes of import duty at £2000 and had lodged the necessary amount of cash, as *ad valorem* duty, with the Customs officials.

However, I was now informed that they had seen newspaper reports cabled from England to the effect that the car had cost something like £20,000 to build; they therefore regretted that they were unable to allow it to be cleared unless I lodged a further £16,000. I replied that I had never seen so much money!

Eventually, a way out of the difficulty was found by shipping the car in bond down to Florida. I thought that possibly the Customs officials in Florida would take a slightly more broad-minded view of the matter.

Accordingly, after a few days in New York, the three of us decided to go down by sea to Jacksonville, with the mechanics, and get a little peace, which we would not have got had we gone by land. The car was sent on by rail, although in the first place I had intended to bring this with me by sea; but this proved impossible, as the 8000-ton boats of the Clyde Line were not large enough to pass so big a crate down their hatchways.

We sailed on the Clyde Line *Mohawk* and arrived in Jacksonville three days later, after a most enjoyable voyage, stopping at Charleston, South Carolina, where we went ashore for a time. This is one of the oldest towns in America, and it was here that the first shot of the Civil War was fired.

I had expected that on reaching Jacksonville we should be able to land the touring car, which we had with us on the steamer, fill up with petrol and motor quietly over to Daytona, a distance of a hundred odd miles; but no sooner did we arrive than a committee of welcome from Daytona, accompanied by the Mayor of Jacksonville, came on board, and we were taken off to an official luncheon, while the touring car was landed and filled up. After this we set out at the head of a long line of cars to Daytona.

Much has been written about the scenery of Florida, but in spite of all that has been said it has never been fully done justice to. Its vegetation is sub-tropical, and the climate is something to dream about. The coast scenery is wonderful.

On the way down I was very amused to hear some of the comments of some of our new-found American friends on this car. It was a standard 3-litre Sunbeam touring car, capable of 90 miles an hour. This type of car is non-existent in America. I had beside me Mr. Frank Pierson, the Secretary of the Daytona Beach Chamber of Commerce, and his remarks, interspersed with plenty of " Gees," were themselves worthy of a separate volume.

Some six miles short of Daytona Beach we were stopped by a cordon of police stretched across the road. I naturally supposed that we were going to be run in for exceeding the speed limit. Not at all. It was merely the Chief of Police, who had arrived with his escort to bring us into the town. We waited until the other cars had caught up with us, then formed up in a line with a bunch of motor-cycle police on each side, and drove down on to the beach. In the distance we noticed a line of camera-men stretched across the sand, in front of a large building, and a huge crowd of people. We pulled up in front of it (this was the hotel where we were going to stay) and were officially introduced to the Mayor and Corporation of Daytona.

One remarkable thing about America is that the majority of men in official positions are so young. In England one imagines a mayor as a large, fat, venerable, white-haired old gentleman. Mayor B. F. Brass, on the other hand, is a young, vigorous man, in the early 'thirties. He made our stay a real pleasure, and made us feel that the town of Daytona Beach was really pleased to have us there.

After all the greetings and handshakings were over we went up to our sitting-room, and sat down to realise that we had at last arrived.

After arranging the garage for the car, and rooms for the mechanics, we took the touring car and went down to have a look at the beach. It was some 20 miles long, dead straight, 500 feet wide at low water, and constitutes a veritable marvel of Nature. The sand is hard and absolutely flat. The prevailing wind is usually north-east. All along one side of the beach, and stretching the whole length, is a line of low sand-hills.

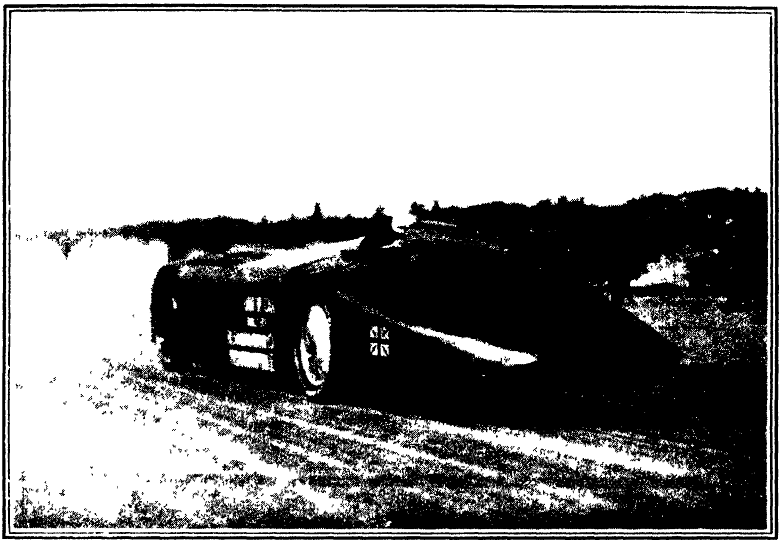
As soon as we saw it we realized that here, if ever, was the one place in the world where a speed of 200 miles or more an hour could be attained.

Next day we interviewed the officials of the Contest Board of the American Automobile Association who had been sent down from Washington, together with surveyors and other officials incidental to the organisation of the attempt. I was immensely gratified to see the thoroughness and carefulness with which the organisation had been dealt with. Every detail had been worked out beforehand. Plans had been made and printed of the telephone installation, the electrical wiring installation, the ambulance arrangements, arrangements for dealing with the crowd, and, in fact, every conceivable thing had been thought out.

Meanwhile, the car had not arrived, and I began to get worried about this. Telephone messages all along the line failed to locate the " END DOOR BOX CAR " (covered truck) which contained our " hope." The delay was, however, not serious, because we had still plenty of people to see, and much work to do, to make our arrangements complete, and ensure everything working without a hitch.

Two days later the car was located at Savannah in Georgia, having had some slight trouble. From there it was rushed through to Jacksonville, and from there to Daytona by a special locomotive, together with the necessary Customs officials to discharge the bond and allow the car to be uncrated. I shall never forget the excitement when the car arrived, or the enormous crowds which followed the lorry to the garage to get their first view of this ugly monster which was supposed to be capable of such a fantastic speed.

By this time it had become painfully obvious that I should have to get an assistant to help me with the great amount of work and organisation,



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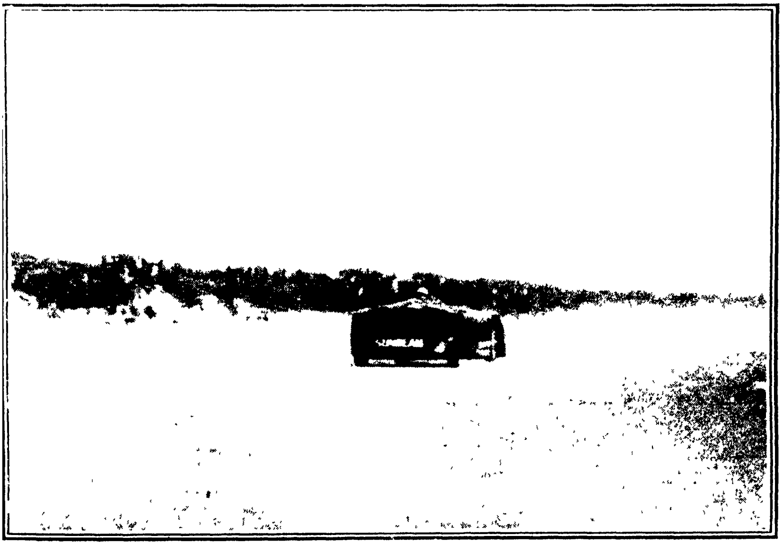
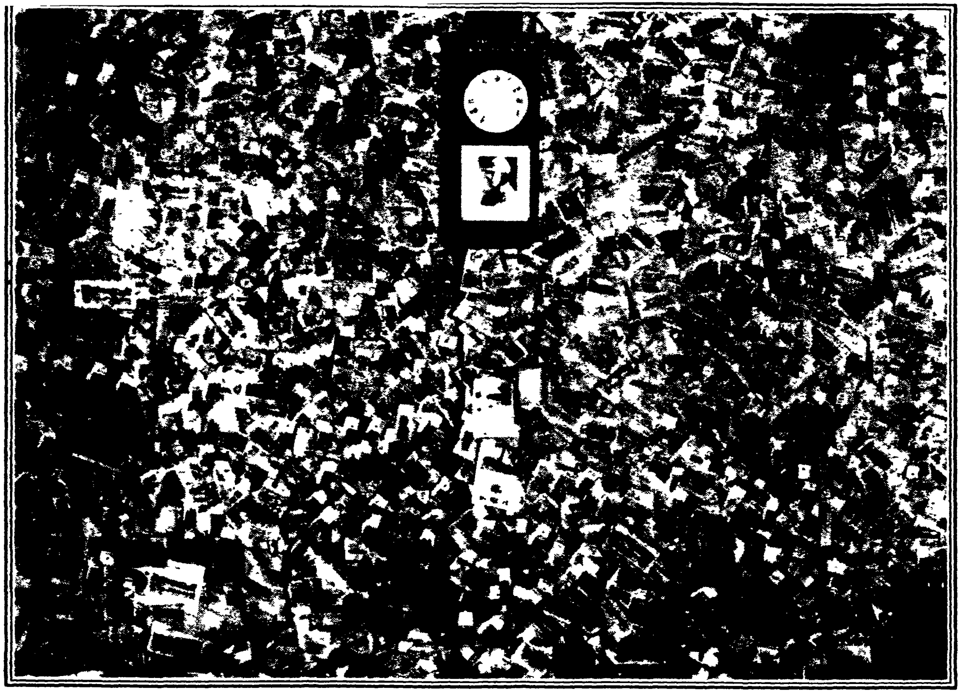


207 M.P.H



THE BULLETIN BOARD OUTSIDE THE CHAMBER OF COMMERCE
(7′ by 10′)

attended as it was with so much publicity. Reporters arrived in shoals at the hotel, and kept constantly asking for interviews. Mr. Myers, of the Contest Board, who was to act as judge of the attempt, suggested to me that I could not do better than approach Mr. William F. Sturm, also of the Contest Board, and ask him if he would consent to act as my manager while I was in America. To this Mr. Sturm agreed, and I formed an acquaintance which quickly ripened into a close and sincere friendship between all of us.

William F. Sturm, or " Bill " as I shall call him from now on, proved himself invaluable to me in particular, and to Guinness and Rossmore in a minor way. No call upon him was made which did not meet with a prompt response. And it is not too much to say that without him the success of the entire project might have been jeopardised. He took over the interviewing and acted as a medium between myself and the Contest Board, and the many officials upon whose province we trespassed.

The Press were continually asking me what I should do with the car and when I should take it out. I told them that I had never driven the car before, except for a few seconds at the works at Wolverhampton, and that I intended to take it out exactly three times. The first time would be to see what it felt like to drive and to get used to driving it at low speeds. Then the second time, I should make it fairly fast, to see what it felt like at high speeds, and finally, I should go for the record.

It had now become obvious that we should require a much larger number of police to control the crowd. A car of this size at high speeds is not controllable, and obviously there was great danger in having people running about all over the sands when such a car is in motion.

Mr. Calhoun, the Chief of Police, was approached, and I asked whether we could have a greater number of police to control the crowds on the sands. He replied that we might have as many as we liked. We asked for double the number, and we got them.

During the second attempt it was decided by the Contest Board that, although we were not going for the actual record, it would be a very good rehearsal for them if we were to make the run over the course and the timing strips, as they would thus be able to see whether their electrical circuits were in order, and eliminate any possible chance of bad connections on the day of the attempt. This we agreed to do, and accordingly I set out to go about three-quarter speed. The speed shown on the chronograph should have been about 180 m.p.h., but imagine my astonishment when I finished and was told that I had only deen 166 m.p.h.!

I could not understand it, and I immediately cabled to Wolverhampton for certain information, upon receipt of which I decided to lower the gear-ratio, by putting smaller sprockets on the cross-gear shafts. Had this alteration not been made I am sure we should have registered an even higher speed than the 207 m.p.h. which we eventually did obtain.

The mistake occurred in this way. Although the police force had been doubled, it was still insufficient to keep people from driving their cars over or walking on the timing strips. The time-keepers, upon looking at the strips, found that speeds of from 166 to 280 m.p.h. were registered. Consequently, they decided that the safest thing to do would be to announce to me the lowest recorded speed.

Acting upon information received from Wolverhampton we started to change the gear-ratio that night. This reduced our maximum possible speed by some 15 m.p.h.

I had also begun to discover that there were certain factors entering into the case which I had not troubled about up to that moment. The first was the question of wind resistance. In this run on the beach I found that the air passing through the front radiator travelled over the front engine, and then reached the cockpit with such force that it nearly blew me out of my seat. This was the more astonishing when you realise that this air had to overcome the resistance of the radiator in the first place, and secondly, the resistance of the engine with all its piping and control rods. I saw clearly that, before I could attempt to go all out, steps would have to be taken to insulate the cockpit completely.

Another, and in fact the most important, item discovered was that it would be impossible to travel at 200 m.p.h. with my head exposed to the full pressure of the air. I had driven the car exactly as it had left Wolverhampton, and there was fitted an inclined protecting cowl in front, made of aluminium sheeting, slightly curved upwards to protect my head. The cowl, however, was low enough to allow me to look over the top and steer the car. In practice it was discovered that the wind pressure on one's forehead amounted to about 150 lbs., so much so that one's goggles were not able to be kept in place, and one's hat was nearly pulled off one's head.

The car was taken back to the garage, nearly all the way under its own power, and another matter cropped up, which, although an incidental one, made us realise that we should have to tow the car back to the garage in future. The two back radiators which cool the back engine had their air led to them by two ducts, or scoops, placed on either side of the body. But when the car was travelling below 130 m.p.h. the cooling effect was practically nil and the water started to boil.

The change speed also was difficult to manipulate. The change-speed lever travelled through a very big arc from second to top, and I did not engage the top speed enough to mesh the teeth to their full depth. The result was that the selector mechanism seized slightly on the splined shafts owing to the heat which was generated in the box. It is one thing to say that you will change from second to top at 130 m.p.h., but it is another thing to do it. Incidentally my maximum speed was 90 m.p.h. in first, 135 m.p.h. in second, and 212 m.p.h. in top.

That afternoon and evening we all did some hard thinking, and realised that there was a certain amount of work to be done in order to ensure the maximum amount of comfort and safety for the record attempt.

The surface of the sand, too, had begun to be slightly affected by the wind, and there were one or two furrows, which precluded any really high speeds for some little time. In view of this, we decided to inform the officials of the Contest Board that we would not go for the record for about a week, which would give us time to make the necessary alterations to the car. When this decision was made known to them, they decided to return to Washington, and come back the following week.

Meanwhile we started work on the car. We completely blanked off the cockpit with aluminium sheeting, making the driver sit in a more or less air-tight compartment. We increased the height of the protecting cowl, or wind scoop, by having an additional piece of sheeting fitted. We freed the selector mechanism in the gear-box and we increased the projecting area of the air scoops in the back of the car. As a matter of precaution we re-lined the brakes. All this took some little time, as each job, though trivial in itself, was difficult because we had to dismantle most of the body before being able to get at what we wanted to do.

Within a week the car was ready, and we cabled to Washington asking the officials to return.

On March 27th they returned, and we held a conference to finish all the various details of the organisation. In a case like this, where so many officials all doing different tasks are involved, the only way to deal with the matter is to start from a " zero hour," and then to plan every movement of every individual and every car from then on. Our " zero hour " was taken as 8 a.m., Florida time, and this was the time set for the police to start to clear the course. This took them about an hour, and at 9 a.m. the racing car was scheduled to leave the garage, with the towing truck, breakdown lorry, the crew of mechanics, and the spares.

My intention had been to do two runs of the course, one from north to south and the other from south to north, with the wheel-coverings *off* the back wheels of the car. I knew that once these were *on* I should gain another 5 to 7 miles an hour in speed, but, at the same time, there was the grave danger that if I had tyre trouble, the tyre would become entangled between the outer covering and the chassis, and cause an accident. I did not think that the car would do the 200 m.p.h in its original state, that is to say, with these covers on. However, the necessity to have them did not arise, as the coveted speed was attained with the car in its safer condition.

I think that the best way to describe the record itself would be to give you the official report on the attempt as published by the Contest Board of the American Automobile Association :

> " The writer (Mr. Haresnape) was notified late on Sunday, March 27th, that everything was in order for the run on Tuesday morning and immediately left Washington for Daytona Beach, arriving at 2 a.m. on Tuesday, March 29th. The other officials arrived at 5.45 a.m. All arrangements were immediately checked over. Major Segrave and Mr. William F. Sturm (whom he had engaged to assist as manager of arrangements and in handling publicity) had prepared a supplementary set of conditions to correct such errors as had shown up at the trial run on Thursday, the 24th.
>
> Officials proceeded to the course at 8 o'clock in the morning. Prior to that time the course

had been closed to the public and the various units, such as the surveying crew, the electrical crew, the telephone crew, and the police, were all functioning smoothly and exactly to mark. The car arrived promptly on the course at 9.30. Both still and motion pictures were taken, each of the various officials reported to the writer that his part of the work was complete, and that the run could take place, and word to Major Segrave was given.

He proceeded to station 9 on the course, turned round under his own power and was reported by the various telephone stations as flying back towards the official course. The car swerved slightly upon approaching the official course for a distance of about a mile and a half due to wind, but was promptly corrected and went flying by.

In attempting to decelerate upon completion of the record course and in approaching station 0, Segrave found his brakes ineffective, and ran into the ocean for a slight distance sending geysers of water spouting over the car. Just prior to this another gust of wind caught and swerved the car into the line of flags, taking down several, but without any damage either to himself or the car or other incident.

He rounded about the stakes at station 0 and was reported at once as returning over the course. A quartering wind had been blowing from north-east to south-west at a velocity of about 18 m.p.h. Running south he had the advantage of this wind giving a higher average, and upon decelerating again at station 9 he returned under his own power slowly to the official timing stand, where he dismounted and awaited the first computation of results. Upon hearing that he had broken all records by the astonishing margins that he did, and after conference with K. Lee Guinness and others of his staff, he determined to let well alone and an announcement was made over the telephones and to the Press that the trials were concluded as every goal sought by the invasion had been attained.

The judges and official timer immediately repaired to a private room, where the results were re-calculated three times over, then checked one against the other. These figures were incorporated by the chief timer in a written report, affidavits were at once dictated by the proper officials and everything in the way of original and official data assembled in proper form. Announcement was then made to the Press as to the official results.

The announcement of the trials was carried in every newspaper of the United States and given unusual prominence. Reports already received recite equal interest among the Continental Press.

The industry, the racing fraternity, the Press, and the public alike congratulate Major Segrave and the Sunbeam Motor Company of England on the fine display of engineering ability and dauntless courage underlying the records accomplished. This writer also wishes to thank all concerned with the attempt, including the members of the visiting party, officials of the Chamber of Commerce at Daytona Beach, its Chief of Police, Engineer J. R. Brennon, and Messrs. T. E. Myers, Gar Wood, and Odis Porter who so generously gave of both time and ability as officials in charge for the splendid and unvarying co-operation received.

An estimated crowd of 10,000 watched the first trial run on March 21st. They were densely thronged around the garage where the car was being prepared, packed along the entire approach to the course that had been cleared and almost solid on the sand-dunes bordering the nine-mile course.

Even more remarkable was the attendance on the run at daybreak of March 24th. Many had apparently camped out all night. At any event at daylight some thousands were already in the most advantageous positions and they were still assembling at the time of the run at 6.30.

Press announcements had been made as to the exact hour of the concluding run and at least

15,000 people were in attendance. At this latter run not one person or car was on the beach for nine miles with the exception of police, both mounted and foot, the telephone operators, the electricians, and the authorised officials. A remarkable demonstration of what can be accomplished by efficient co-operation.

It was a marvellous sunshiny day, the beach was in excellent condition, and the whole trial was over from the time the car first approached until it was towed away in thirty minutes.

You will find attached and made part of this report the following exhibits :

Nos. 1. Affidavit of Chief Timer.
2. Original tape from timing machine.
3. Affidavit of Official Surveyor.
4. Affidavit of Technical Examiner.
5. Rating reports—1922, 1924, 1927—on chronometer.
6. Cable stating timing instrument was approved.
7. Blue print of Chief Surveyor showing ties, etc.
8. Original plan of organisation.
9. Supplementary organisation notes.

Respectfully,
(signed) V. Haresnape.

V. Haresnape,
Secretary, Contest Board, A.A.A.
Official representative in attendance."

Since returning home many people have asked me what actual sensations I underwent when driving for the five kilometres, at a speed in excess of 200 m.p.h.

Frankly, these were very hazy. During the first test run I very soon realised that it would be quite an impossibility to drive the car unless some adequate form of protection was provided to shield me from the wind pressure which was almost incredible.

The steering of the car was a comparatively easy matter when going straight, but the slightest gust of wind deviated her from her course, and the task of getting her back again was extremely difficult.

The best example of this I can give is that the sensation was very similar to that of a pilot on the bridge of a big liner. He rings down to the engine-room to have the engines put astern. The time between the giving of this order to the engine-room and the moment when the ship actually ceases its forward motion and begins to go astern, is appreciable. During the period when I ran off the course on one of the runs, and cut down some of the marking flags, I had the steering wheel turned round nearly a full half turn, without apparently causing much difference to the direction.

Eventually, luckily for me, she slewed round, but with a very gradual motion, and I was even forced to over-correct in the opposite direction to bring her back again to a central course. It is interesting, however, to note that though this skid covered perhaps 400 yards of actual distance travelled, it was over so soon that I had not the time to think about taking my foot off, or do anything but wrestle with the steering wheel: and by the time I began to think that I might be getting into difficulties, and that I had better take my foot off, the car was back again on its original course.

I went and looked at the stumps of the flag posts later. Although they were four inches square they had been shaved off as smoothly as though by a razor!

A lot has been said about the car going into the sea at the completion of one of the runs. I was also told that I should have known better than to have attempted to apply the brakes at such a high speed.

The answer is that I fully realised this point, but I thought that the wind resistance alone would have been sufficient to slow the car up very rapidly from 200 m.p.h. to about 75 m.p.h. Such was emphatically not the case, and I did not, in actual fact, apply the brakes until after I had covered the total distance of nine miles, over which the car travelled. I was then forced to apply them.

When they did not work satisfactorily, I was faced with the alternatives of keeping straight on my course, and running into the Halifax River, turning to the right and running into the sandhills, or turning to the left and running into the sea.

Obviously, the last course was the best, as either of the others would have involved damage to the car. The car did not hit the sea at any very great speed—I estimate it at perhaps 55 m.p.h. The moment it hit the sea the speed was instantly reduced, the car swerved landwards again, and I was able to turn round under my own power and start up the course again without even a missfire. The depth of the water into which the car went was not more than 18 or 20 inches, and the only effect it had was a " cushioning " one.

I must qualify the statement that the brakes did not work adequately. To give a more technical description of this, we discovered that what actually had happened was that the aluminium shoes themselves had fused, and melted, run, owing to the terrific heat generated. This does not in any way reflect on the designer of the brakes, nor does it reflect on the maker of the aluminium, but it proves that the present-day design of brake is inadequate at tremendously high speeds, when it is called upon to retard a vehicle as heavy as this particular car.

I think that those of my readers who have followed the results of this test ought to know something about the inner history of this car, which in itself is a very wonderful compliment to its designers and manufacturers—a most wonderful compliment because, when this car was still in embryo on the drawing-board, its designers announced publicly that it would attain a speed of 200 m.p.h.

"The Patron" and Captain Irving adhered to the statement, and their faith remained unshaken during the months when the car was being built, and throughout the criticism which was showered upon them. Their statements have been completely and absolutely vindicated, which alone is a wonderful triumph, and goes to show how far and how closely theory and practice tally in modern engineering. To them must go the greater praise, for the part I played was merely an incidental one.

Throughout the entire tests not one spanner touched the engines, not one single nut or bolt was altered, and nothing was moved beyond modifying the brakes, steering, gear-ratios, and body.

Of course, in the years to come, this record will be beaten, as all records are, and as progress continues, but I venture to think that whatever new record may be created in the automobile world, this one will stand alone as being one of the most remarkable prognostications made by two fearless men, who had absolute faith in their own engineering ability, and in the fact, hitherto believed impossible, that a speed of 200 m.p.h. with safety on land was capable of being realised.

CHAPTER XV

THE FUTURE OF RACING CARS

AS the Irishman said of another thing altogether, racing cars " have a great future behind them."

So far as my own career is concerned I have had far more than my proper share of luck. There are many things that I can look back upon that I ought to have done better, and indeed, there are some things that I could have hardly done worse, but taking things as they have turned out, I can definitely say that I have been very lucky. I have had my share of speed on the ground, and I cannot imagine any inducement big enough to make me go out and try to break my own records.

But, at the same time, there they are, and the odds are a great many millions to one that they will not remain indefinitely.

At one time there was a certain section of the motor industry in Great Britain which, you might say, lived and thought and had its being in records, and record breaking. To clip a few fifths of a second off someone else's time for the half-mile they would go to the length of building a special car for the purpose. Quite possibly to do so then was a paying proposition. It brought advertisement, and reputation in the racing world was reflected in a greater public demand for the touring cars of equivalent make.

Times, however, have changed and racing has become by no means the easy, cheap, convenient, and certain method of advertising that it once seemed to be. Of course, when the company concerned has nothing but a long unbroken list of successes to fall back upon, the Chairman has no difficulty in getting the accounts passed at the annual General Meeting. But when the inevitable failure—the bad-luck year—arrives, and the racing programme is found to have absorbed a sum quite big enough to have turned a loss into a profit, shareholders are apt to get a little bit restive. I really do not see how they can be blamed. On the one hand there is the evident fact that profits in the British motor industry are harder and harder to make ; on the other hand is the equally incontrovertible truth that racing cars are more and more costly to build.

As I have previously explained, it had long been my ambition to be the first person to travel at over 200 miles an hour in a land machine. But I should be idiotic indeed if I imagined that that record of 203 m.p.h. would be allowed to stand indefinitely. Had we played our cards with the skill with which we might have played them ; had we not been misled by mistaken diagnoses of quite accidental symptoms, that figure would have been substantially higher. I know that some time or another my figure must, and will, be beaten. I am quite content that this should be so. When the challenge comes my determination is to let the glove lie where it is thrown, unless an English car does not appear to be able to regain the laurels for this country.

Now that we know that this speed is capable of realisation, it is very much easier for those who follow after to set their minds to improving on it. The pioneering work has been done. In the interest of science, and whatever country they may come from, I sincerely hope they will, and wish them all the luck that I had.

The plain truth of the matter is that I wanted to exceed 200 m.p.h., because 200 m.p.h. is a good round arbitrary figure. The next one that really counts, I mean, that will stick more than just transiently in the public mind, is 240 m.p.h., which equals 4 miles per minute ; the next to that is 250 m.p.h., because it is a quarter of a thousand . . . and then there is a big gap, for 300 m.p.h. is the nearest arrangements of numerals that has a genuinely psychological importance.

I suppose this will depend upon the country in which we have been brought up. The unit of time is international, it is the unit of distance that varies. The Greek athlete probably thought some six parasangs per hour were the extreme limit; the Latin has aimed, in automobilism, at his 300 kilometres per hour, and the Russian at his 300 versts. It is just a question of round figures.

But between these arbitrary stages there is ample room for repeated endeavour. The figure will be worked upwards and upwards.

In the matter of surface transport, I think that the time will come when 100 m.p.h. on the road is recognised as being a not abnormal speed. And there is little doubt that when anyone wants to go faster they will employ an aeroplane.

As a matter of fact, it is not too much to say that the modern challenger of land speed records is almost more of an aeroplane than a motor-car.

The problems involved in making it manageable at 200 m.p.h. and over are purely aerodynamical problems. The problems involved in making it attain that speed, even given unlimited engine-power, depends solely upon the ability of the designer to cut down wind resistance to a minimum, by means of stream-lining, and to reduce the possible effects of side gusts by incorporating aerial organs—a fin, for example, which give the car a directional stability, precisely similar to the directional stability of an aeroplane. Here, I fancy, we can clearly perceive that we approach the useful limit. I do not mean the limit of human endurance, for it would be a bold man who would set bounds to that; nor do I mean the ultimate land speed.

Rather, I would refer to the limits of the machine. If a 900 h.p. engine in, say, a seaplane, can do 300 m.p.h., and if even in the most optimistic calculations it cannot do more than 240 m.p.h. on the ground, it is clear that the proper place for the machine in which it is installed is in the air. In which case the problems concerned with it are wholly aerodynamical. So far as the efficient utilisation of power is concerned, the motor-car has no hope whatever of approaching the aeroplane. I believe the latter will be doing its 350 m.p.h. long before the car has done its 250 m.p.h.

Here let me say that—having had a taste of what the doing of the thing means for myself—I have nothing but whole-hearted admiration for those indomitable spirits who are not only ready, but anxious, to set up new world's speed records. I do not, however, regard this as one of these endless processes. Exactly at what speed, or in what year, such end will come one cannot pretend to guess. But there must be an end! It will arrive automatically, when the game ceases to be worth the candle, or, to put it in another way, when those who can afford to build unlimited-power racing cars lose their interest in the business.

History invariably repeats itself, and when one glances back at the record of any mechanical means of transport, one sees that it passes through a period of transition and experiment up to the time when it reaches perfection, and then any experiments which take place are conducted along orthodox lines, and are really more in the nature of developments than experiments.

Take the railways, for instance, there has been no really marked development in the design of locomotives for the last ten or fifteen, or more years.

So I think it will be with the automobile. Owing to the near state of perfection which the automobile has reached at the present day, the need for carrying out experiments along unorthodox lines has diminished. Therefore the need for constructing specialised racing cars will automatically diminish also.

In the olden days when cars were not the rapid, reliable engines of locomotion which they are now, any firm producing a racing car and incorporating the improvements discovered as a result of racing, invariably reaped the benefit of the experience thus gained, by the increased sales of their standard model.

This was when the racing car was not so vastly different from its touring prototype ; but, nowadays, things have changed, and the racing car of to-day is so totally different in every way from its touring brother that the two bear little or no resemblance.

Thus, I think that, although there will, of course, always be motor racing, the type of car that our firms will race will gradually evolve itself into a " boosted " or " hotted up " edition of its touring brother, as in the case of the 24-hours' race for the Rudge-Whitworth cup at Le Mans.

In America they are now running " Stock Car " races, thus gradually showing the trend of events.

Hence I think that the land-speed record will not have to be taken to a very much higher figure than that at which it stands to-day. This is really the only record worth having. All the others are subject to arbitrary classifications and regulations, the purport of which is to reduce the speed, rather than increase it.

No doubt, for years to come, we shall still have classes for cars of given capacity, in which nobody takes the slightest interest, though their accomplishment is difficult enough in all conscience. We shall have, in place of races for specialised cars, races for standard cars, and, as has been the case in the past, the firms which take the matter seriously will be able to make " rings around " the other contestants.

CHAPTER XVI

SOME OBSERVATIONS

Some observations upon the future of motor transport—Speed and kindred subjects—Road, rail, air, and water—Which will triumph ?—Uneconomic goods transport.

I SHALL try to confine these predictions to those which are not merely wild imaginings with no reference to what has been done in the past, but are based upon a foundation of common sense, logic, and ascertained fact.

It would be absurd to attempt to deal with the possibilities and probabilities of mechanical road transport without briefly reviewing the situation of transport in general. We can reasonably assume that transport is the most effective of all the handmaidens that modern civilisation has pressed into its service, whether in circumstances of peace or war. We must at once definitely acknowledge the obvious fact that the greater the progress that is made in civilisation the greater is the importance assumed by those scientific developments that can be turned to useful account in warfare. This is a pity, but I am afraid that it must always be so.

Now, taking transport generally, we can divide it into the following clearly defined branches :

1. Water.
2. Rail.
3. Road.
4. Air.

I have put these in the order of their slowness, which, incidentally, is the inverse order of their economy, as normally maintained to-day.

As everybody must have noticed, water, so far as inland transport is concerned and with the exception of a very few rivers, has almost ceased to be an element of importance in the carrying of industrial cargoes. Our system of canals—a proud possession at one time of day—lies largely neglected. Grown thick with weeds, these once vital lines of communication now only carry one-tenth of the tonnage which they used to in the days before the motor lorry.

From the point of view of economical transport the canal is admirable. A single horse can make three miles an hour with a load that it could hardly move on rails and could certainly never start up on the road. But the canal barge is too slow for modern requirements. Even when it is pulled by a tug or driven by its own power plant it can hardly mend its traditional speed. For one thing, the water is too shallow for higher rates of travel to be attempted, and for another, the canal banks are not strong enough to bear the brunt of a heavy "wash."

For all that I am strongly of the opinion that there will be a revival in the utility of canals even as there has been so conspicuous a revival of the road. The time cannot be far distant when *every* means of transport will have to be fully exploited in order to relieve the intolerable congestion upon the roads. Then our waterways will be kept busy upon the transport of cargoes in the movement of which there is no need to hurry.

By that time it is likely enough that many industries and individuals will have realised that speed is, *per se*, a most costly investment. Everybody can understand how, under the stress of latter-day industrial conditions, time always seems to be the essence of the contract, and how, further, it seems always imperative to send things at express rate. But that is the fault of bad organisation. Every year millions of tons of produce of one kind or another go by road or rail when it could go, just as well, by canal. This fact will be realised when we really seriously consider our national outgoings in transport and the iniquity of the "hit-and-miss" methods by which it is now carried out.

No one who is interested in such matters, can have failed to notice that of late the road has manifested a tendency to usurp the functions of the rail to such an extent that one could say, without exaggeration, that if one system of transport had to go, the stoppage of all the railways would cause less disturbance of industrial and social life than the closing of all the roads. This phenomenon is by no means exclusive to Great Britain. All over the world railway receipts are being hit, both in the passenger and freight departments, by the competition of the road motor vehicle.

Whereas railway speeds have remained very much the same for the past forty years, road speeds have increased very rapidly. And so has road comfort. The up-to-date, six-wheeled motor coach, with its smooth, lively, silent, six-cylinder engine, its low centre of gravity, its four-wheel brakes, and its pneumatic tyres, can safely put up almost as good an average as any decent touring car, and no one who has ever ridden in one can have any doubts as to why it receives an enormously increasing amount of public patronage.

It is the same with goods. You cannot blame a manufacturing company for sending its products to its consumers in fleets of motor lorries. First of all, the goods go more or less direct from door to door. Second, they do not have to be transhipped and man-handled with the consequent liability of damage. Third, the cost of operating the lorries compares (so far as the manufacturer is concerned) very favourably with the cost of sending his stuff by rail.

Thus it is that we find railway companies (particularly their shareholders) complaining that receipts are falling off, threatening to increase their rates, and so on.

To anyone who wishes to get first-hand evidence as to the comparative conditions of road and rail, the best advice I can give is the recommendation to take an hour or two's flight in an aeroplane over any of the more conspicuously wealth-producing regions of this country. From above he will mark the intense activity of the roads. Or, if he is not keen on flying, and wants to get a similar view-point on terra firma, let him take his stand at the southern end of Vauxhall Bridge. Here is a railway bridge that carries as busy a group of lines as could be found in this country. Let him mark the infrequency of the trains, and mentally compare the movement they represent with the intensity of the road traffic at this point.

There is nothing new in drawing attention to this state of affairs. It is patently illogical and undesirable. For the rail, if it was properly administered, ought to be essentially faster, cheaper and safer than any other kind of transport. Given a certain load and a certain speed, it requires much less power to propel on rail that it does on the road.

Some little time ago, Colonel J. T. C. Moore-Brabazon, M.P., an old racing motorist—and a past Parliamentary Secretary to the Ministry of

Transport—in writing about the traffic problem of London, put forward the suggestion that elevated viaduct roads should be built over the existing railways that enter and criss-cross the Metropolis. It is an ingenious and sound notion, but it may well be asked, " Would such roads be necessary at all if the railways beneath them were kept properly busy ? " There can only be one answer to this question.

It is said of Chopin that he never would write letters, but invariably sent his communications by telegraph. In the national case, in Britain at all events, very few of us are even prepared to concede that we are doing something equally foolish and uneconomical. In the vast majority of cases we are sending goods, so to speak, by telegram, when the three-halfpenny post would do just as well, if not better.

Some day this anomalous state of affairs will be put right : in the meantime it is very easy to see how it has been brought about.

The taxation of heavy industrial motor vehicles is utterly out of proportion to the damage which they do to the highway, compared with the wear and tear which is imposed upon it by touring cars. The operator of a fleet of lorries is accordingly in the happy position that " somebody else " is paying for the upkeep of his permanent way. . . . True, he contributes a certain amount, but nothing like enough. The railway company is differently situated. It alone pays all the outgoings upon its permanent way, having neither a road fund nor the local rates to draw upon.

In the future—I will leave the phrase in this indefinite form—there can hardly be any doubt that a halt will have to be called in the national expenditure on roads. Obviously we cannot go on drawing from the Road Fund. Some means of replenishing the exhausted coffers, or of clipping the outgoings, will have to be found, and one is convinced that this will probably take the form of a readjustment of taxation on a more equitable basis all round. By such a scheme a very large number of cargoes which now travel by road will be thrust back on to the rail, to which they properly belong, and once again the road will become the domain of the vehicle of personal transport.

Naturally, all this will not be accomplished without a great deal of conflict and upheaval, but it must be accomplished for the simple reason that Great Britain absolutely cannot afford to discard the finest railway system in the world and build roads to take its place. Even if we had all the gold in America, it would be a bad proposition. It would be an equally bad proposition to try and substitute air transport for road and rail transport. Dr. F. W. Lanchester, F.R.S., believes that the tractive effort for flying is about equal to that of dragging the same load in a sledge along a dry macadam road. Hence it must be always uneconomical, except for loads that have got to get to their destination in the very minimum of time.

With regard to the air, I think there can be little question that its era will be upon us very soon. Let us suppose, for a moment, that all the transport that now cumbers the street and the main road is diverted to the rail and the canal. That would give us an enhanced degree of freedom upon the highway, but only for a short time. If there were no goods traffic upon the road the touring car would multiply in numbers even more rapidly than it is doing to-day. Hence before long we should be up against the same old problem of surface congestion.

You can go under this problem, as the Underground railways have done. Or you can soar above it, as the aeroplane does. Both alternatives have benefits of their own. It is easy to see, however, which mode of transport will appeal to the car-owner. He will go into the air. This will, no doubt, involve his burrowing into the earth as well, for, at least as far as London is concerned, it is imperative that aerodromes be linked up with tubes to the centre of the Town.

It is conceivable that the prejudice against the aeroplane, as a means of normal transport, will last long enough to affect the motor-car very seriously. Unless something is done to thin out street traffic, we are within measurable distance of the time at which an order will go forth that no private car is to be brought within a three-miles radius of Charing Cross. The thin edge of the wedge has already been put in, and no one who uses his car in the West End of London—or in other big towns —can possibly imagine that the authorities are really glad to see him when he begins to enquire for a parking place.

At long last—at very long last one might well say—capitalists have realised the profits that are to be made from huge, properly equipped garages on the full-size scale in the West End. Even if a couple of dozen of these establishments were put up to-morrow, the most they could hope to do would be to palliate the existing conditions. They could not pretend to cure them. It is the unalterably narrow city street that governs transport development. No amount of traffic control can disguise that fact. There is the pint pot, and a pint is all that you can squeeze into it.

A traffic stream is rather like an electric current, for it depends for its force not only upon the number of vehicles concerned, but on the speed at which they travel. Now on the open road—" open " representing the conditions under which there are not more than twenty vehicles per mile going in one direction at a time—there should be no great difficulty in getting things speeded up, always provided that the " heavies " are reduced in number. But it is quite another thing in the towns. There are definite limits to which the speeding-up process can be taken, and one is inclined to think that we are very closely approaching those limits already. Undoubtedly, this is so in London, Paris, and New York already. Other big centres of population will soon follow suit.

Now, as has been said, " time " is the essence of the contract. That is simply another expression for speed. The traffic conditions which are about to grow upon us must inevitably exert a big influence in determining the design of our cars. They have already begun to do so. The automobile attribute that we shall seek, above all others, in the future is the ability of terrific top-gear acceleration, so that the same car which will give 80 or so on the Great West Road will still trickle modestly down Bond Street in top-gear. For all I know, it may have its engine in front with a front-wheel drive, or its engine behind with a rear-wheel drive, but the sort of car that is going to be acquired is nevertheless a product of post-war racing experience. Those qualities upon which a premium has been placed, i.e. stability, controllability, terrific get-away, super-efficient braking—these are the qualities that the future touring car must have if it is to be of any real use to its owner. Of course, in racing work we do not mind how many gear changes we have to make, whereas the modern car driver is becoming less and less inclined to use his gear-change lever. That problem, however, can be, will be, and is being, solved by the multi-cylinder engine, in which type alone liveliness in power output can be combined with smoothness of operation.

Curiously enough I think that the modern motor coach has derived more direct advantage from racing-car design than any other vehicle. Walking round last year's Olympia car show, I could count, almost upon the fingers of one hand, the makes of touring car that had really " learned something " from years of intensive racing upon which literally millions of pounds must have been spent by the British motor industry alone. Those lessons had been far more seriously taken to heart at the Commercial Vehicle Exhibition.

It was as though the builders of the leviathans of the road had suddenly realised what the combination of speed, safety, and comfort could mean.

I am not at all sure that the motor-coach is not going to encroach into the province of the touring car. The greater the vehicular population of our roads, the more they are straightened, widened, and rendered uninteresting, the less will we be disposed to sit behind the steering wheel. I can well imagine that many a man who now enjoys the blessings of a country life in his non-working hours, thanks to the possession of a car of his own, will find himself wondering whether it will not pay him better to leave his car at home and engage an eighteen-penny arm-chair in a Pullman safety coach. If it does nothing else it will at least give him a chance of reading his morning paper in peace.

Whether or no this tendency actually occurs—I mean the more general employment of public transport vehicles for utilitarian purposes—I imagine that there will be a marked change in touring-car conditions. We shall gradually incline towards two types of car, the very big and the very small and two cars instead of one—the larger for country work, the smaller for town. But at the same time the public-service vehicle will grow.

Sooner or later we must all come down to the question of horse-power and to the basis of economics of transport. Even supposing our oil supplies were utterly unlimited, transport is still a matter of pure economics. We can put it like this: 900 h.p. will fly a single-seater aeroplane at 300 m.p.h.: it will push a single-seater motor-car at 200 odd m.p.h.: it will take the Scotch Express from King's Cross to Edinburgh at about 60 m.p.h.: it will drive about twenty motor-coaches (with twenty passengers in each) at about 30 m.p.h. on the road.

At present the coach seems to have an advantage over the railway train for relatively short journeys. So long as our roads are kept in a reasonable state of repair, this condition looks like lasting for a few years. Therefore, I believe we shall see the combination of the private car and the public coach serving the transport needs of an increasing number of people.

CHAPTER XVII

THE ROMANCE OF THE ROAD AND WHAT IT MEANS

Let the blow fall soon or late,
   Let what will be o'er me;
Give the face of the earth around
   And the Road before me.
Wealth, I seek not, hope or love,
   Nor a friend to know me:
All I seek the heaven above,
   And the road below me.

THAT song of travel, from the incomparable pen of Stevenson, rings as true in the heart of the motorist as in that of any vagabond.

No one can remain a pessimist when he considers the genesis and mission of the Road, how it first came into being, avoiding the chance-laid resistances of hill and water; bringing one man in touch with another; conquering every difficulty, and laying the foundations of that mutual understanding, that community interest, without which we should still be shivering in our woad.

Future generations of motorists will drive upon their concrete highways, reeling off straight miles towards the distant horizon, between concrete kerbstones, set with mathematical accuracy. Speed will be theirs, greater than we have to-day. But they will never have the real fun of the road as we had it before roads were specially built for motor traffic.

I am not one of those who subscribe to the doctrine that steam-engines took all the romance out of the sea, and I will never believe that steam-lorries and chars-à-bancs and sixty-foot fairways ever could take all the romance out of the road. They have to a certain extent disguised it, but they can never entirely hide it.

Because the greatest thrill in my life was in driving a car down a wide straight, that no main road—lavishly as they are built nowadays—could equal; it has often been suggested to me that I should hail with enthusiasm the creation of those great turnpikes upon which speeds of up to a hundred miles an hour are often not only possible but safe. Nothing could be further from the truth. There is—for some psychological reason which I am quite incapable of analysing—a certain thrill in the element of speed. But for its fullest enjoyment speed must call for skill and judgment. The man who sits behind four aces, four kings, or four queens, will scarcely get a thrill in declaring a " small slam " in No Trumps, at the Bridge table. But let three of these kings be against him and there will be something to play for. He will have to fight for " game."

So it is with the road. There is no fun in flaring down a straight highway with policemen or scouts at every corner to give me the " all clear." Anybody can do that in any car. And for that reason I sometimes think that posterity will wonder how on earth we could ever have been enthusiastic about " motoring."

But it will be many years before all the roads in Europe are straightened out, and until that happy day comes there will still be scope for judgment in the nice taking of a turn, the anticipation of a hill, the quietening down for the almost invisible farm lane, and that " give and take " which is so charming and endurable a mark of consideration between one man and another. I shall have no need for my motor-car, except as a means of getting about, when the road is disciplined upon the lines of a railway track. I will not go so far as to say that scouts and policemen standing at cross-roads, and controlling the traffic, have spoilt my motoring for me, but I will assert this, that because they are habitually there, because they are so often superfluous, and because they give the decision which the man or woman at the whee ought normally to take for himself, they are tending to make us into a mechanised nation of obedient Robots.

A friend of mine said to me recently, " I drive five-and-twenty miles into London every day, and five-and-twenty miles out. Unless I select absolutely unearthly hours for these journeys, I am *never* allowed to use my judgment. There is always somebody there to tell one authoritatively exactly what one must do and what one must not do. Why don't they put up signals and be done with it ? "

Of course, the Road of Romance will be with us for many years to come (how pleasant it is to pore over the maps of Bacon, Phillips, Stanford, and Bartholomew—the very names are great in spirit !), but the modern road *is surely all wrong*.

It may go in a direct line from A to B, and, Heaven knows, most places are becoming as uninteresting as an algebraical symbol these days, but still it does not necessarily go in the right way. It ought to have functions additional to that of being the, reasonably, shortest distance between two points. I do not know of any road in Great Britain that is properly built. I do not know of one that is even designed with a view to satisfying the requirements of modern motor traffic.

When John London Macadam introduced successfully his historic road-making methods some one hundred and twenty years ago, one of the secrets of the results which he obtained—which were in every way better than anything that had gone before—was his employment of the camber principle. His surfaces were built of crushed stone bonded together with mud driven into the interstices of the structure, and it was therefore absolutely necessary to arrange matters so that water was given the smallest possible opportunity of entering and washing this bonding mud out. Again, if in winter water got below the stones it, would freeze and expand and in this way exercise a very destructive influence upon the highway surface.

During the last few years the accepted methods of road construction have undergone a revolutionary change, but even with tarred and otherwise waterproofed surfaces the camber idea still persists. It is a nuisance, and an anchronism : it is totally unnecessary, and it is exceedingly dangerous. I am sure I am not overstepping the mark when I say that literally *thousands of accidents are annually caused by road camber*, every one of which should be and could be avoidable if designers would only use a little intelligence.

The analogy is, that when one thatches the roof of a hut, one must put the thatch at a very sharp angle to encourage water to run off. If, however, one is using a galvanised iron roof, this can be set very nearly perfectly flat, and the water will still roll off quite easily.

So it is with the tarred and concrete road. The camber needs to be so slight that it can hardly be perceived by the eye. Of course, in a modern road there is always some possibility of pot-holes forming, owing to a local weakness in the structure, but even a most excessive camber would be inadequate to drain these off.

Of the many bad results of excessive camber, perhaps the worst is that it induces all drivers who study their own comfort—which means roughly 99·9 per cent of all drivers—to cling as long as possible to the crown of the road, and only go to their proper side when they are forced to do so. This is highly dangerous and the immediate cause of many mishaps. From the economical point of view nothing could be worse, for it means that the traffic burden, instead of being evenly distributed over the whole fabric of the road, is confined to the centre. Practically, therefore, only about half the width of the road is really effective. The physical effect of the camber itself is, of course, inimical to the stability of the car.

The road—even the most up-to-date road—as we know it in this country is not the road of the future.

There is only one proper way to build a road for high-speed traffic conditions, and this has, I fancy, been abundantly proved in America. The highway should consist of two practically flat tracks of concrete. (This is the ideal material, since it is waterproof, and always, being granular in texture, provides a good grip for the tyre.) Between these two tracks is the centre portion of the road, which can be of tarmac or macadam.

In these circumstances the drivers of all vehicles are directly encouraged to hold to their proper side They do not take the centre of the road unless they want to pass someone else. This centre portion, because it gets less wear and tear than the smooth side tracks, can be cheaply constructed, and it does not matter very much if it is a little bit bumpy. At all events, this bumpiness only penalises the man who wants to get " way ahead of everybody."

There is no reason, as far as I can see, why this centre portion should not be arranged to drain the flanking tracks of the road, the whole being given, for this purpose, a very slight reversed camber.

I am a convinced believer in the ultimate, and indeed near, future of concrete, not alone as a structure for roads, but also as a surface.

We never suffered at all from the glaring head-lamp nuisance until the black-surfaced road came into existence. The moment it becomes wet it reflects the light as efficiently as a polished mirror, and consequently a dark object in the middle distance is very difficult to see, for the background is black.

Now in the old days of gritty-surface macadam roads we got a highly desirable diffusion of light, and anything was seen against a light-coloured and well-illuminated background. Let anyone try driving at night (preferably in the wet) behind a pair of old-fashioned acetylene head-lamps—which in their day were quite good enough for fast work—and he will realise what an enormous difference has been made by this change in road colour. Even to-day it is a blessed relief to get in a country lane at night, for one feels that with the light surface one can see everything that is in front quite clearly.

What has happened with head-lamps is simply this, that, because of black roads, the bulbs have had to be made more and more powerful to render night driving even reasonably safe.

I am sure I am right in asserting that the future road will be as white as possible, thanks to its "holding," granular surface. That must be so in the interests of higher night speeds on the highway. And it is in hours of darkness that high speed can most safely be indulged in, for there is less traffic about, and the vehicle carries with it, that best of all warning signals, a ray of light.

One thing I feel sure the road of the future will *not* have, and that is the high concrete kerb at each side. I can conceive nothing more futile or more potentially or actually dangerous. In the event of a skid occurring they are a veritable death-trap, for the sideways travelling wheel cannot mount them. It simply crashes into them and gives the vehicle every possible chance of turning over and causing one of the worst sort of accidents that can occur.

No doubt the idea of erecting these bluff high kerbs (apart from strengthening the road structure, which, however, is only done by that part of them which is underground and invisible) is to permit drivers to see the limits of the highway. In this they are a dismal failure. They would be a success in every way if their top surfaces, instead of being flat, were inclined inwards at an angle of thirty degrees or so. That would enable the side-slipping wheel to ride over them, and it would also render them easily visible.

The worst of the motor movement is that in so many ways it seems to proceed in a vicious circle. The function of the self-propelled vehicle is to provide a greater measure of speed and a greater range of distance. Yet in the big towns we find that traffic jams are far worse than ever they were in the old horse-drawn vehicle era. Thus, it is more than possible—it is distinctly likely—that city speed will be slower than ever in a year or two's time. Then what is the inherent charm of motoring ? It is not merely the ability to get from one point to another. It is largely the constantly changing scenery upon the way. The motor-car has taught Britons more about their native land than all the other educational agencies combined. But, alas, we are approaching the era in which this state of affairs will largely cease to exist, for the very popularity of the car has involved the building of trunk roads, which "by-pass" a large part of all that is worth seeing.

Perhaps, however, our grandchildren will find the British main roads they have to use as interesting and as beautiful as they used to be. It is devoutly to be hoped so!

SIR HENRY SEGRAVE . . . THE FINAL CHAPTER

BY J. WENTWORTH DAY

Editor of *The Lure of Speed*, joint author of *The Life of Sir Henry Segrave*, and author of *The Life of Sir Malcolm Campbell.*

WHEN *Miss England II* rose suddenly in the air like a flying-fish and dived beneath the waters of Lake Windermere on June 13, 1930, England lost the man of a century.

De Hane Segrave meant more to this country than a mere breaker of records. He was a scientist who contributed greatly to the total of human knowledge ; a man who explored the unknown at the imminent risk of death ; who stood to our youth as a hero in fact, an inspiration in verity. He dared greatly and died magnificently.

His first words as they lifted him, broken in bones and life, from the waters he had conquered at the instant of death, were " How are the lads ? "—his mechanics—and then, " Did we do it ? " He died knowing the answer.

Segrave was descended from those Sjo Greves, or Sea Lords, who settled at Segrave in Leicestershire in the ninth century. Hereward de Segrave, Lord of Segrave in 1080 when Domesday Book was compiled, was a direct descendant of Harold, Prince of Denmark, who established the family in England. When the King, with his own hands, conferred the accolade upon Segrave at Craigwell House, Bognor, where His Majesty was recovering from the illness which was so nearly fatal, the old flower of knighthood bloomed again. For once a man had been knighted for truly knightly deeds.

The tale of Sir Henry Segrave's exploits has been fully told. But few people realise that in him Britain possessed one whose courage, modesty and extraordinary charm of manner made him one of the most truly valuable ambassadors this country has possessed. His prestige abroad was unbelievable.

Mr. Kaye Don recently gave me an example of this. He said that when he was at Lake Garda, in Italy, to compete for the Segrave Motor Boat Trophy which d'Annunzio presented in honour of Sir Henry, the affection with which his memory was preserved was remarkable. And when Mr. Don, after his own magnificent performance, was summoned to receive the personal congratulations of Mussolini, the Duce's first words were an expression of his admiration for Segrave. It is fortunate that Segrave's magnificent pioneer work in the world of water speed had such a worthy successor.

Segrave died in the knowledge that he was the first man on earth to travel at over one hundred miles an hour on water just as he had been the first man to travel at over two hundred miles an hour on land. His actual speed shortly before his death was 96·41 m.p.h. on the first run, and 101·11 m.p.h. on the second. But he had set himself the goal of two miles a minute . . . and he tried again.

The drone of the enormous 4000 h.p. engines rose once more to a deafening bellow. The white boat leapt forward like a flying-fish. It seemed to poise on the wave of its own creation. It was a thing of terror and of beauty, a poem of speed and power.

And then, in a breath the beauty was tragedy. The boat leapt high in the air, turned over on itself, disappeared in a welter of foam. Little blue twists of smoke arose. The engines raced underwater for a second. Then silence.

A moment later a white figure struggled feebly on the surface, a bald head gleamed.

"Thank God, it's Segrave!" A sigh went up. He was brought ashore. His thigh was broken in two places. Rib after rib was smashed. A few hours later he died. England had lost her modern Drake.

A few weeks previously he had said to me, "Jim, if I go out, may it be doing something worth while. God save me from dying between the sheets."

He died as he would have wished, in the full flower of achievement, in the heat of action, at the moment of victory. . . . We may say of de Hane Segrave as Captain Scott wrote of Oates at the South Pole, "We knew it was the act of a brave man and an English gentleman."